



Bixby Energy

Service Manual

Confidential Material – Intended for Bixby Dealers Only

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Detailed Product Descriptions

Touch Pad Operation – Automatic Starting System

The Touch Pad contains four (4) buttons and eight (8) red LED's.

- ON: Starts the stove
- OFF: Turns the stove off
- ▲ : Increases the heat setting
- ▼ : Decreases the heat setting



Figure 1 - Control Panel Touch Pad

The Bixby MaxFire and UBB are extremely easy to start. Fill the Hopper with corn and push the “On” button (see figure above). Within two to three minutes you will see smoke briefly in the Firebox as the corn ignites, then a flame. The fan supplying outside combustion air will quickly clear the Firebox of smoke as the stove begins to run. The Start-up sequence for the stove lasts approximately 17 minutes. During this 17 minute period, a pre-set program will ramp the stove up to heat level 4, is not affected by user input and will ramp the stove up or down to the user preset level at the end of this 17 minute period.

Except for the first level of change which is immediate, three (3) minutes are required for the stove to adjust to each new higher level of heat. The delay is a built in design in the software program. This is to allow the stove to stabilize before continuing to the next higher level. The ramp down time will be somewhat different depending on how the stove is operating. The time between each level will be between 3 and 10 minutes per level ramping down.

<u>Examples:</u>	Level 1	to	Level 2	immediate
	Level 5	to	Level 6	immediate
	Level 1	to	Level 3	3 minutes
	Level 1	to	Level 4	9 minutes
	Level 8	to	Level 1	3 minutes minimum
	Level 8	to	Level 7	3 minutes minimum

Figure 2 - Heat Level Change Times

As you can see by the examples, the Bixby Stove does not react to change as fast as other fuels, such as natural gas, react. This process is required to keep the stove burning consistently and efficiently while changing heat level settings. Later as we discuss adjustments to the stove, you will understand that time is needed to make any changes to the stove. BE PATIENT!

Eight Heat Level Settings on the MaxFire allow the user to adjust the amount of heat output of the stove from 8,000 BTU's to 50,000 BTU's, (6,000 BTU's per setting). The output of the UBB runs from 12,000 to 70,000 BTU's. The set-point level is indicated by the eight (8) LED's on the "Touch Pad" (see fig. 1); one LED will be lit for each heat level setting. Note: the LED's DO NOT give indication of the level which the stove is running on at any one point in time.

The LED's also function in a diagnostic capacity and light if a specific problem or problems occur. The label, shown below, is on the inside of the hopper door. We will go over the diagnostic function later in the training.

CAUTION

Operate this unit only with the fuel hopper lid closed. Failure to do so may release products of combustion from the hopper under certain conditions. Do not overfill or extend this hopper.

CAUTION

Moving parts in lower portion of the hopper. Keep hands clear when stove is in operation.

- Hot while in operation
- Do not touch, keep children, clothing and furniture away.
- Contact may cause skin burns.

See Nameplate and Instructions

FLASHING INDICATOR LIGHT SYSTEM

The 8 heat level indicator lights on the Bixby Heater are also designed to act as potential problem indicators. Whenever one of these lights begins to flash, consult the chart below for reason and recommended solution.

LIGHT #	INDICATES	SOLUTION
1	Power failure during stove operation	Push the "Off" button and then the "On" button to restart.
2	Operating temperature not reached	Check for fuel in hopper. If fuel is present, push the "Off" button and then the "On" button to restart.
3	Exhaust system or hopper area is overheating	Contact your Bixby Dealer.
2 & 3	Empty fuel hopper or blocked flue	Check hopper for fuel, if fuel is present, refer to the manual for stove and vent cleaning instructions.
4	Stove door is ajar (open)	Make sure the door is tightly closed. Contact your Bixby Dealer if problem continues.
5	Ash bin drawer is ajar (open)	Make sure the ash drawer is tightly closed
5 & 7	Ash bin drawer was open for too long while running	Close ash drawer and restart the stove
6	Exhaust fan failure	Contact your Bixby Dealer for service.
7	Fire pot mechanical malfunction	Push the "Off" button and then the "On" button to restart. If malfunction continues, clear jam in burn pot once cool.
7 & 1	Left igniter failed	Contact your Bixby Dealer for service. The stove will continue to operate, but will take longer to ignite from a cold start
7 & 2	Right igniter failed	Contact your Bixby Dealer for service. The stove will continue to operate, but will take longer to ignite from a cold start
7, 1, 2 & 3	Internal error	Unplug stove. Contact your Bixby Dealer for service
8	Feeder wheel failure	Open hopper lid, remove feeder wheel access cover, clear jam and restart stove. If this continues, contact your Bixby Dealer for service.

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Figure 3 - Hopper Cover Label

The stove is turned off by pressing the "Off" button. This will start a shut down mode program which will last about 30 minutes. This program will allow the stove to consume the remaining fuel and cool the stove before turning off completely

The Ash drawer containing the ash may be emptied even while the stove is running. Once the drawer is opened and removed, there is a 20 minute period of time allowed to empty the ash and replace the drawer. During this time, the stove will not perform an ash dump. If the drawer is not replaced within the 20 minutes, the stove will go into the shut down mode for safety.

This new technology allows self-starting and ease of heat adjustment is a *revolutionary* break through and a competitive advantage.

Feeding System and Hopper

The large Hopper is capable of holding almost two bushels of corn, or about 106 pounds. The user needs only to fill the Hopper every one to 2 ½ days, depending on the heat level setting. See the chart below for approximate run times per full hopper of fuel. The higher the heat setting, the more often the user will have to fill the Hopper.

Approximate Hours/Full Load/Per Setting (MaxFire)*

Level	Aprox. Feed Rate lbs/hr (kg/hr)	Time Between Ash Dumps	Aprox. Hours/ Full Load
1	1.8 (0.8)	21 Hours	57
2	2.1 (1.0)	17 1/2 Hours	48
3	2.3 (1.1)	16 Hours	43
4	2.6 (1.2)	14 Hours	38
5	3.0 (1.4)	12 1/2 Hours	34
6	3.5 (1.6)	10 1/2 Hours	29
7	3.9 (1.8)	9 1/2 Hours	26
8	4.6 (2.1)	8 Hours	22

*Assumes running at a single level, actual time will vary as the burn level changes, starting and shutting down, and trim knob adjustments.

Figure 4 - Approximate Burn Times

Corn feeds into the Burn Pot through an innovative Feeder Wheel made from a special composite material. Designed to work similar to a “Ferris Wheel”, the design helps prevent corn from jamming as it is fed into the Burn Pot. The Feeder Wheel has slots designed to deliver pelletized fuels efficiently. Another feature of the Feeder Wheel is a cover plate that goes over the Feeder Wheel. This keeps corn from putting pressure on and jamming the Feeder Wheel. Should a jam occur, the Feeder Wheel Gear-motor is designed to mechanically reverse, thus clearing the jam. The Gear-motor is a 120 volt motor coupled to a gear reduction unit designed to deliver 120 inch/pounds at the output shaft. The feeder wheel is attached by a Hub to the feeder wheel gear-motor output shaft.

Most pellet stoves use an “auger” type feed mechanism which is more prone to jamming. Bixby Stoves have been designed to eliminate jamming and to eliminate the passage of exhaust gases between the Hopper and the Firebox which is inherent in an auger design. This is accomplished by a silicone flap that covers the Feeder Wheel slots during feed cycles. In between feed cycles the Feeder Wheel is positioned with a solid portion of the Feeder Wheel over the Feeder Tube. The positioning of the Feeder Wheel is designed to automatically close the opening between the Firebox and the Hopper via the Feeder Tube.

The feeder wheel delivers fuel in an on/off/on manner. To explain how fuel delivery is made, imagine a preset time period for fuel delivery. Within this time period, depending on the heat level setting, the feeder wheel will deliver fuel for a time and then stop feeding fuel for a time. When the stoves' air/fuel ratio is correctly set, it will burn with a flame which will be fairly consistent in height. A flame which would oscillate from a higher to a lower to a higher flame would be an indication of needing to add fuel sooner than we are. This could also be said to be a LEAN burn.

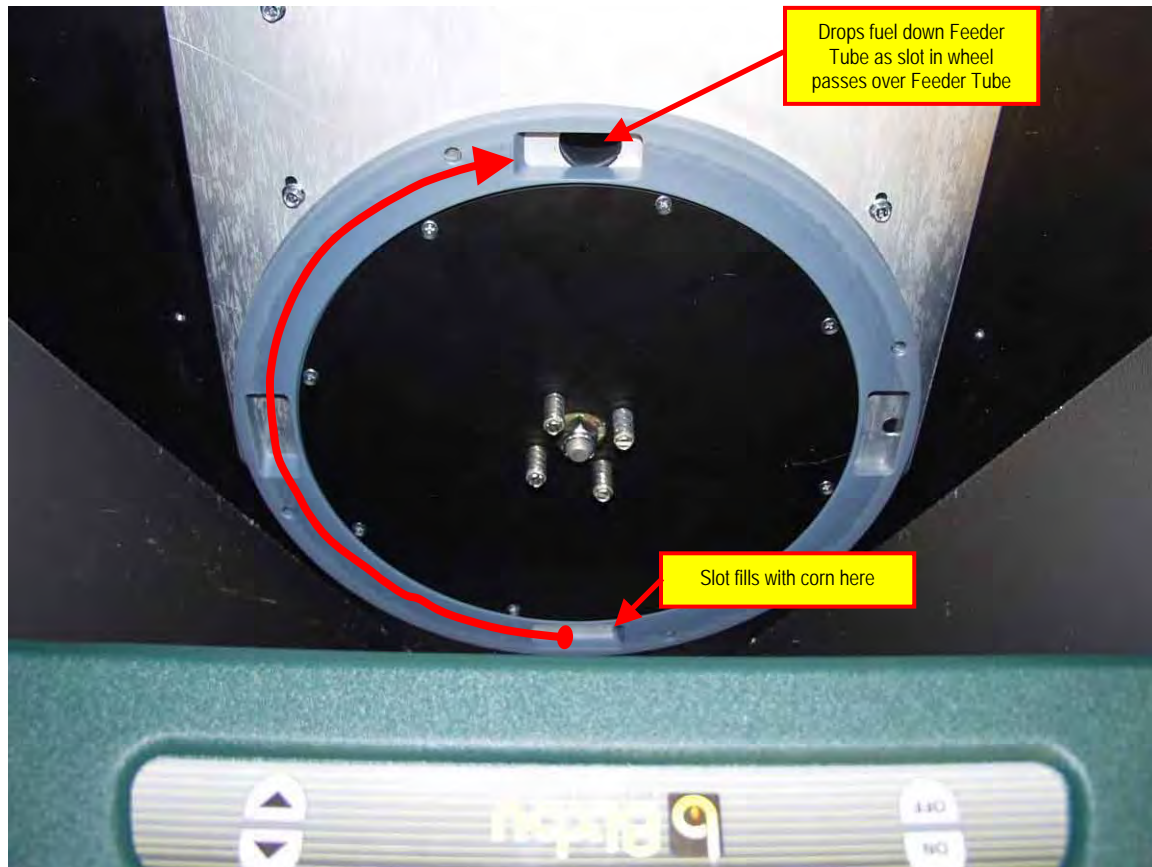
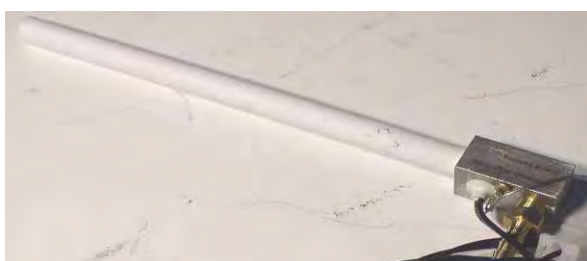


Figure 5 - Feeder Wheel with Feeder Wheel Cover and Silicone Seal Removed

Igniter System

While not easy to ignite, Corn does burn well if the balance of fuel and air is maintained properly. Competitors have tried unsuccessfully to emulate the Bixby self-starting ignition system. The Bixby MaxFire uses an Air Pump and two powerful 500 watt Igniters to ensure a fail safe ignition every time. The Air Pump is a dual diaphragm Oilless Linear Pump that feeds an equal amount of air to each Igniter. The Igniters use a 2500 degree F carbon coil to heat the air coming from the air pump to 1400 degrees F. This amount of heat results in the corn reaching its “flash point” within two to three minutes and igniting. There is no need for any starting aids other than the tip of the user’s finger pushing the “ON” button.



Igniter



Air Pump

Figure 6 - Igniter and Air Pump

The Igniters and Air Pump remain on for a period of several minutes. The Motherboard monitors the time required to ignite the fuel by using a Thermocouple in the exhaust system. Using Artificial Intelligence, the computer decides how long to run the Air Pump and Igniters. The amount of time the igniters run is dependant upon how long it takes the fire to start and the air in the exhaust manifold to reach a pre-determined temperature. The Igniters and the air pump will always run only as long as needed to establish a flame. This prevents the fuel from burning completely up, but still ensures that all of the fuel in the pot will be burning. Should a flame fail to be established, the stove will perform an Ash Dump and retry to ignite a second time. If this fails, an error code will appear indicating a possible cause. The air pump starts up 15 seconds prior to the igniters coming on and lasts for 30 seconds after the igniters turn off allowing the igniters to cool down. In the unlikely event that one of the Igniters would fail, the stove will still start but will give an error indication on the Touch Pad. This will be covered further in the training. The stove will also go into a secondary Start-up procedure. It will run the single Igniters for a longer period of time and feed less fuel allowing the stove to still self ignite. If both Igniters fail, the stove will go into a 3rd Start-up sequence allowing the user to light the stove with a propane or MAPP torch through the Ash Drawer.

The Bixby MaxFire self ignites and burns pure corn!

Burn Pot System

The Burn Pot is the heart of the Bixby stove. This is what sets the Bixby apart from the competition. Heat is generated through combustion inside the Burn Pot which consists of an Upper and Lower vortex Burn Pot. An Upper and Lower Paddle automatically removes ash from the Lower Burn Pot while maintaining burning corn in the Upper Burn Pot.

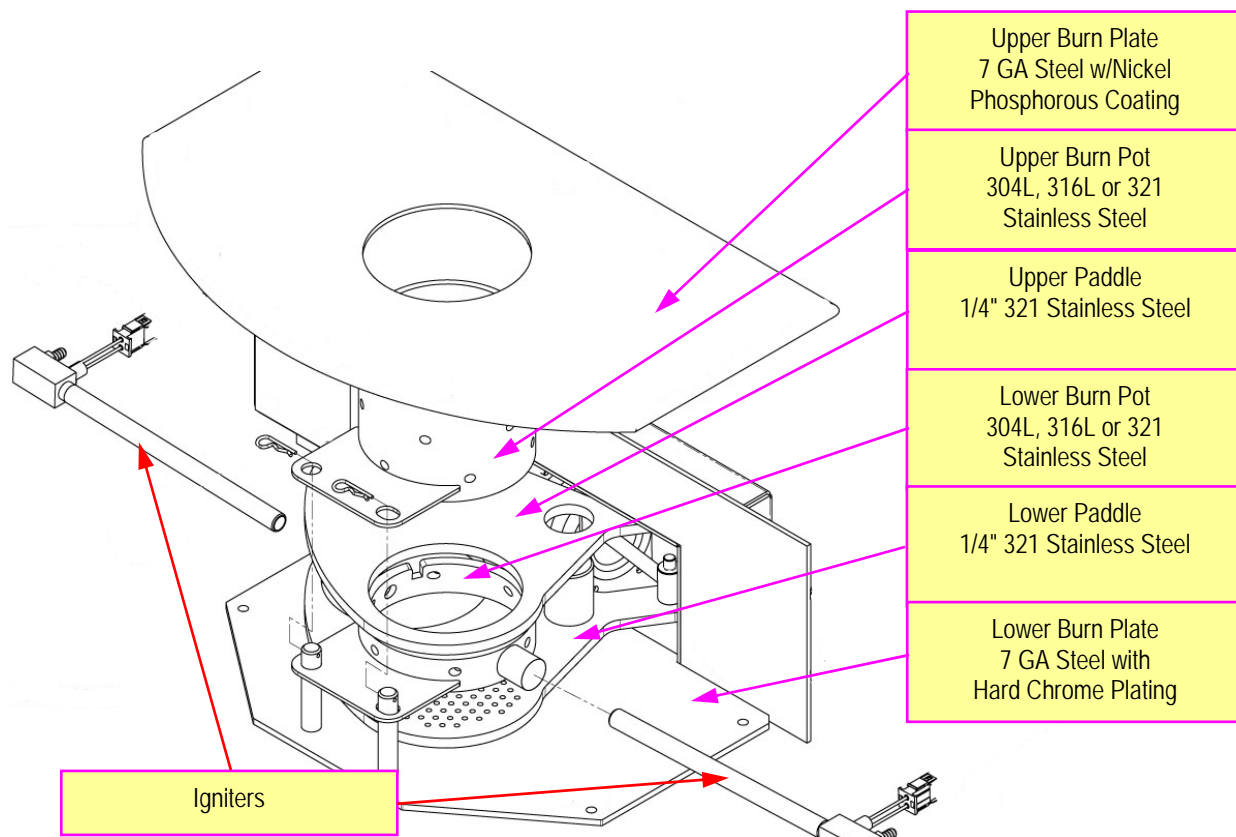


Figure 7 - Burn Pot System - MaxFire & UBB

The individual parts of the Burn Pot System will be described from the bottom most component to the top.

Lower Burn Plate

The Lower Burn Plate (**Figure 8 - Lower Burn Plate**) is the bottom component of the Burn Pot system. It is located on the very bottom of the Firebox and it is bolted into place. The lower burn plate has 3 shafts facing the top of the stove that locate the Burn Pots and Upper and Lower Paddles. The large shaft towards the back of the stove locates the Paddles and the two smaller shafts on the front locate the Burn Pot. This plate is 7 GA steel with a hard chrome plating for superior wear resistance.

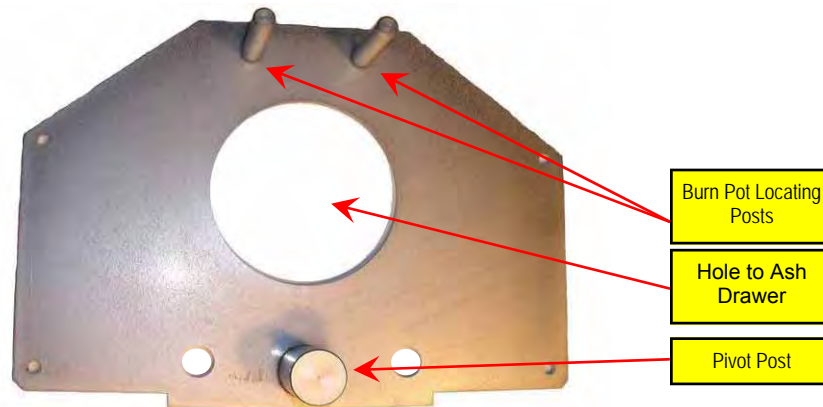


Figure 8 - Lower Burn Plate

Lower Paddle

The Lower Paddle (**Figure 9 - Lower Paddle**) has 2 positions; the run position and the ash dump position. In the run position, the 109 equally spaced holes in the Lower Paddle are positioned directly over the hole in the Lower Burn Plate. The holes allow air to enter the bottom of the Burn Pot. The holes need to be cleaned out periodically and will be discussed in a later section. The dump position is just one large hole positioned over the hole in the Lower Burn Plate to allow the Clinker to drop into the Ash Drawer.

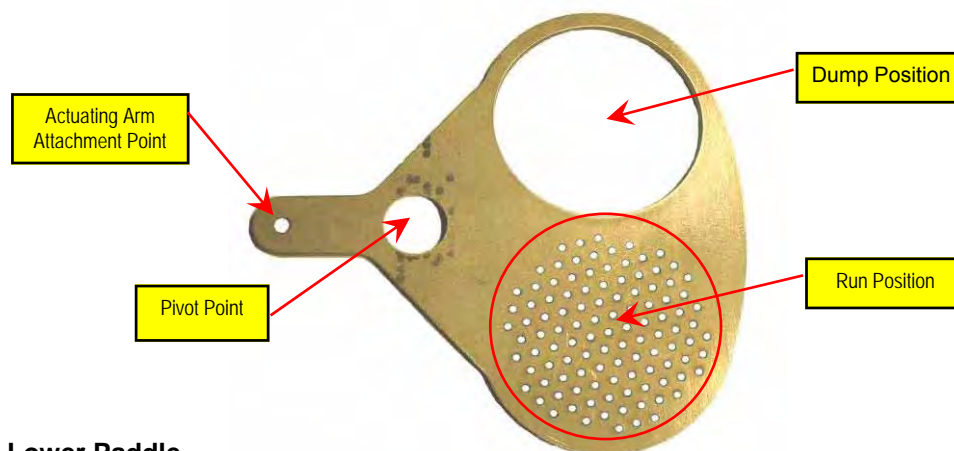


Figure 9 - Lower Paddle

Lower Burn Pot

The Lower Burn Pot (**Figure 10 - Lower Burn Pot**) is just over an inch tall with a slot in the side for a wedge located on the bottom of the Upper Paddle (this will be explained with the Upper Paddle). There is a row of 6 angled holes that create a vortex in the Burn Pot causing the incoming air to swirl around the pot creating better combustion. Also a hole and guide on the right and left side of the pot for each Igniter. The guides assure the igniter is seated correctly into the pot. There is also a locating tab welded onto the front of the pot to keep it in the correct position by sliding over the locating posts on the lower burn plate.

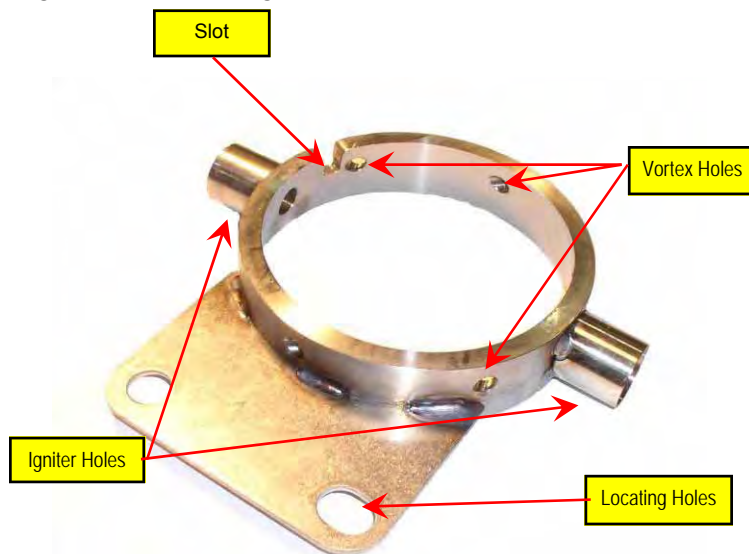


Figure 10 - Lower Burn Pot

Upper Paddle

Next is the Upper Paddle (**Figure 11 - Upper Paddle**) which is similar to the Lower Paddle but without multiple holes in it. This paddle also has 2 positions; the run position and the ash dump position. Changing from the run position to the ash dump position and back to the run position is one continuous movement. In the run position the Upper Paddle sits with the large hole positioned over the Burn Pot to allow corn to fall down to the Lower Paddle (Figure 9 - Lower Paddle). The Lower Paddle in the run is positioned with the 109 holes inline with the Burn Pot. The Upper Paddle has a wedge welded onto it that when moving to the dump position will push the Clinker down into the Ash Drawer. The Upper and Lower Paddles are connected to the Burner Drive Motor by the Burner Drive Linkage Assembly (Figure 12 - Burner Drive Linkage Assembly). The Burner Plates are assured correct positioning by the Burner Drive Limit Switch.

NOTE: the Paddles in the figure is shown upside down for clarity only - DO NOT INSTALL paddles in the stove in this manner!

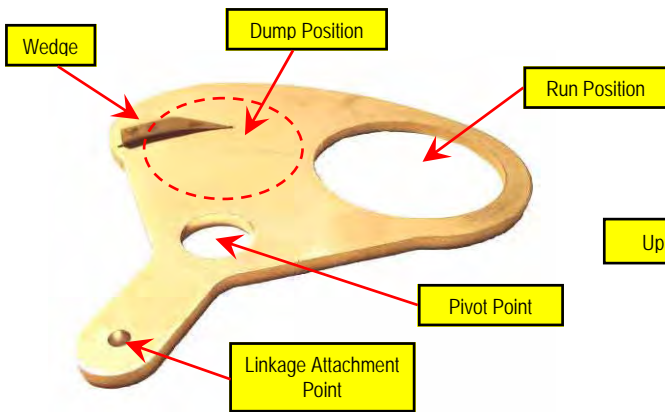


Figure 11 - Upper Paddle

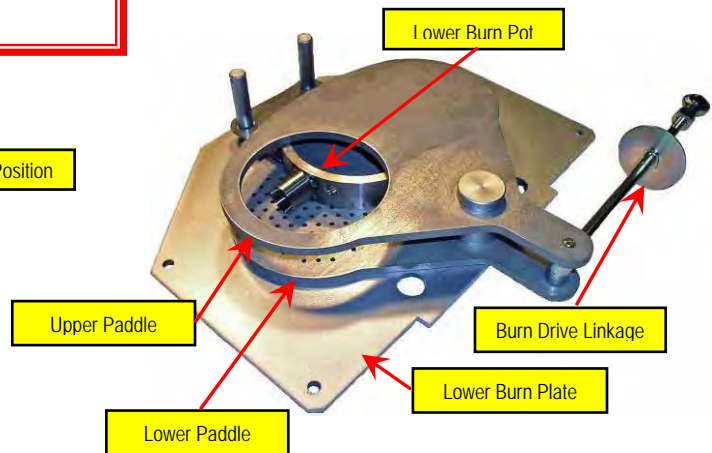


Figure 12 - Burner Drive Linkage Assembly

Upper Burn Pot

The Upper Burn Pot (**Figure 13 - Upper Burn Pot**) is where the majority of the combustion takes place. This pot is about 4 inches tall and has the end turned down to a smaller diameter to mate with the Upper Burn Plate. There are 2 rows of angled vortex holes (6 holes per row), allowing air from the sides to force extra oxygen into the Burn Pot for better combustion. Like the Lower Pot, it has a locating tab on it to ensure that the Burn Pot stays in the correct position. Both the Upper and Lower Burn Pot are locked onto the positioning post by a hair pin cotter pin through holes at the top of the posts.

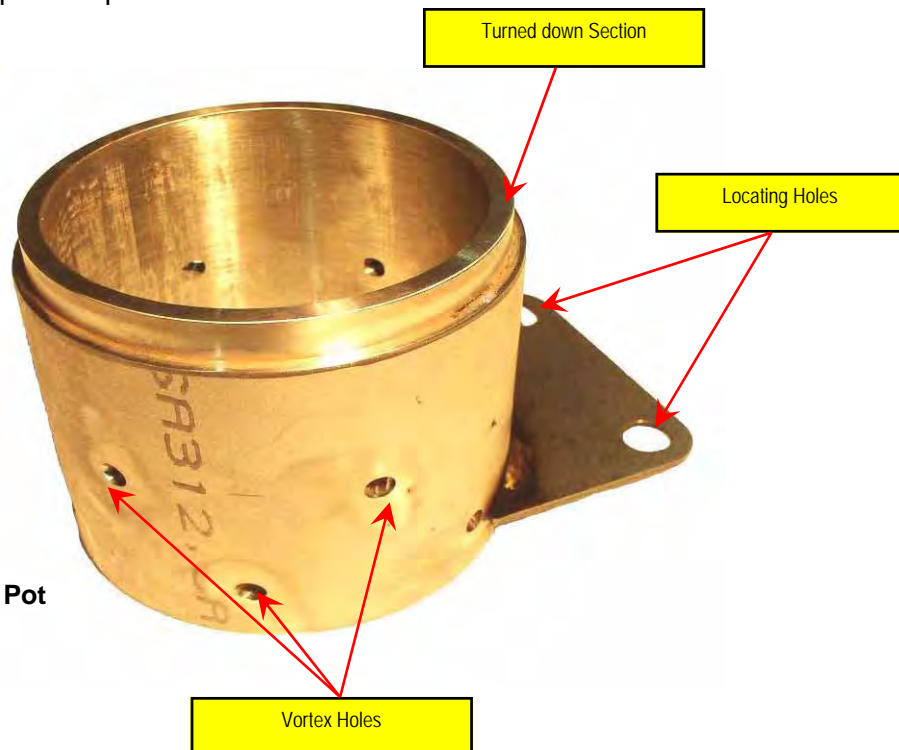


Figure 13 - Upper Burn Pot

Upper Burn Plate

The Upper Burn Plate (**Figure 14 - Upper Burn Plate**) is the last major component of the Burn Pot system. The Upper Burn Plate sits on the top of the Upper Burn Pot and a ledge around the inside of the Fire Box. It is made of 304L grade stainless steel. A high temperature gasket is used to form the seal between the Upper Burn Plate and the ledge that the Upper Burn Plate sits on. The seal forces the intake air under the Upper Burn Plate to go through the vortex holes in the sides of the Burn Pots. Mounted to the Upper Burn Plate is the Fuel Deflector. The Fuel Deflector causes the Corn coming out of the Feeder Tube to spread evenly into the Burn Pot.

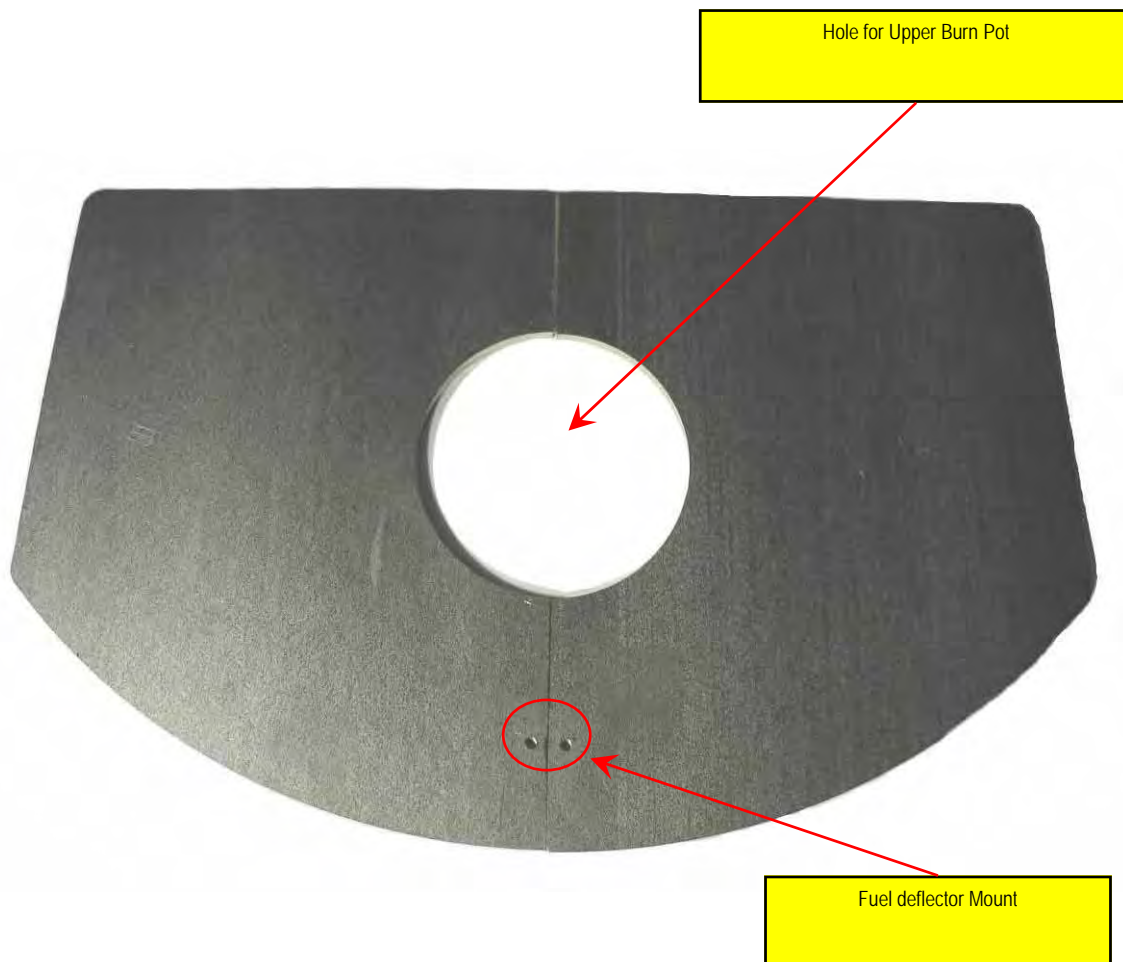


Figure 14 - Upper Burn Plate

To remove the Upper Burn Plate, remove one of the screws for the fuel deflector and remove each half of the Upper Burn Plate.

The Upper and Lower Burn Pots, Upper and Lower Paddles, Upper Burn Plate, Fuel deflector, and Convection Tube Cover Plates are made out of 304L grade stainless steel.

Air to Fuel Ratio

Trim Pot Adjustment

A "positive" increase in the Exhaust Fan increases the speed of the Exhaust fan thus increasing the air flow and Leaning the Air / Fuel Ratio

A "positive" increase in the Feed Rate adds more fuel thus Richens the Air / Fuel Ratio

Thermostat Terminals
Remove Jumper When Using
Thermostat



Figure 15 - Trim Pot Knobs Model 115

To make sure the stove will work correctly in varying conditions, it is sometimes necessary to adjust the air to fuel ratio of the stove. The trim pot knobs also need to be adjusted during the initial setup of the stove. Two Trim Pots (**Figure 15 - Trim Pot Knobs Model 115 & Figure 16 - Trim Pot Knob Description for UBB**) accomplish this. To gain access to the Trim Pots, the left side panel (facing the stove) is removed. The Trim Pot on the right is the "Feed Rate Adjustment Knob." The Trim Pot on the left is the "Exhaust Fan Adjustment Knob." The Trim Pots are used to adjust the air to fuel ratio of the stove for varying conditions (length and angle of venting, composition of the corn and air density). The Trim Pots both have a range of plus or minus 30% from the preset rate which is built into the software. The following page will explain how to adjust the Trim Pots for varying conditions or problems.

This adjustment principle will be the same for all models of the Bixby stove. The Control Panel for the UBB (**Figure 16 - Trim Pot Knob Description for UBB**) has several more controls. The following is from the user manual for this stove.

The control panel is located on the right hand side of the stove near the air filter.



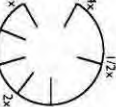
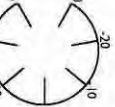
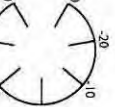

2012009 REV C	<div style="display: flex; justify-content: space-around; align-items: center;"> <div style="text-align: center;">THERMOSTAT CONNECTION</div> <div style="text-align: center;">BIX CHECK RS-232</div> <div style="text-align: center;">FUEL MIX </div> <div style="text-align: center;">CONVECTION FAN </div> <div style="text-align: center;">ASH DUMP FREQUENCY </div> <div style="text-align: center;">FEED </div> <div style="text-align: center;">EXHAUST </div> <div style="text-align: center;">SPARE </div> </div>
CONTROL	DESCRIPTION
Thermostat Connection	See page 8 for Thermostat connection details
Bix Check RS-232	For service use only
Fuel Mix	Fuel A is set to corn and Fuel B is set to wood pellets at the factory. See your Bixby Dealer for additional fuel options.
Convection Fan	Adjusts the speed of the convection fan.
Ash Dump Frequency	<p>Adjusts the timing of the ash dump sequence. If adjustments are not effective, contact your Bixby Dealer for service.</p> <ul style="list-style-type: none"> If the ash dump procedure malfunctions due to jamming, increase (+) the frequency (reduce time between) one step to reduce the size of the ash "cookie". If the fire goes out during the ash dump procedure, decrease (-) the frequency (increase time between) to prevent dumping all the burning coals during the dump sequence.
Feed	<p>Adjusts the rate of fuel delivered to the firepot.</p> <ul style="list-style-type: none"> Make adjustments in 5%-10% increments allowing stove to stabilize before further adjustments are made. If adjustments are not effective, contact your Bixby Dealer for service. If the flame is weak and lazy and the fuel in the pot is building up, the fuel is burning too slow and the fire is relatively cool. Decrease the fuel delivery rate or increase exhaust fan speed (see below). If the flame is oscillating (high flame / low flame) with the feed of fuel, the fuel is burning too quickly. Increase the fuel delivery rate or decrease the exhaust fan speed (see below).
Exhaust	<p>Adjusts the Exhaust fan speed.</p> <ul style="list-style-type: none"> Make adjustments in 5%-10% increments allowing stove to stabilize before further adjustments are made. If adjustments are not effective, contact your Bixby Dealer for service. If the flame is weak and lazy and the fuel in the pot is building up, the fuel is burning too slow and the fire is relatively cool. Increase (+) the exhaust fan speed, or decrease (-) the fuel delivery rate (see above). If the flame is oscillating (high flame / low flame) with the feed of fuel, the fuel is burning too quickly. Increase (+) the fuel delivery rate or decrease (-) the exhaust fan level (see above).
Spare	Not currently used (future expansion)

Figure 16 - Trim Pot Knob Description for UBB

Preparing The Bixby Maxfire For Burning

Be aware that the Trim Pot Knobs come set from the factory set at
+/-0 and +/- 0 do to a test we perform.

First a few things about the stove: (As applied to burning corn and will be similar for wood pellets)

THIS IS NOT AN INDICATION OF A SETTING WHERE THE STOVE WILL PERFORM WELL.

- 1) The stove does not react quickly to any changes made to it.
- 2) When making any adjustments to the Trim Pot Knobs, only turn them 1 line or number at a time. Each line / number is a 6% increase or decrease.
- 3) After making any adjustments....DO NOT MAKE ANY OTHER ADJUSTMENTS FOR AT LEAST 20 MINUTES!
- 4) When first setting up a MaxFire for a proper burn, start out with the Trim Pot Knobs set at:
Exhaust Fan: +/-0
Feed Rate: +/-0
This is a good starting point to start the stove at and not necessarily when the stove will perform well. (On the model 115, rarely do we set the Exhaust Fan to other than the +/-0 or +1)
- 5) The stove has a 20 minute startup period in which it ramps up to Heat Level 4. Set the heat level on the stove to Heat Level 4 during the adjustment period. After you have the stove adjusted, set the Heat Level where you want it to run.
- 6) If you are making adjustments after the stove has been running a while – make them at the Heat Level you are running at the time.
- 7) After about 10-15 minutes into the startup of the stove, you may start to watch the flame for characteristics of the burn.
- 8) Watch the flame for 10 minute periods. During this time look for the burn characteristics as explained in the “Trim Pot Adjustment.”
- 9) Indications of a Lean Burn are:
 - a) Hard Clinkers (cookie, hockey puck, hamburger, biscuit, wafer or any other name you wish to use)
 - b) An oscillating flame – slowly graduating from a high to a low to a high to a low flame over a period of 3 to 8 minutes. (High flame decreasing to a low flame (5 min.) going to a high flame (5 min.) etc.
 - c) A build up in only one side of the Burn Pot
 - d) The flame seeming to come out of only one side of the Burn Pot only.

NOTE: Colder air contains more oxygen per cubic foot of air than warmer air. A cold snap (weather) can cause the stove to run Lean and you may have to increase the Feed Rate for a while.

NOTE: The outside air temperature, the corn moisture content, the corn type and the conditions in which it was grown in will all be factors in how the stove will burn.
- 10) Indications of a Rich Burn are:
 - a) An even build up in the Burn Pot sure as water fills a glass of water.
 - b) A darker, lazier flame.

Figure 17 - Stove Insert for the MaxFire 115

The Ash Dump Process

The Maxfire and UBB does an ash dump according to the amount of fuel that it is fed. At the time of an ash dump, there should be about 1/2" to 3/4" of burning embers in the upper burn pot. This is required to maintain a flame during and after an ash dump. If you are still getting too much fuel in the pot at this time, you could be a little LEAN or RICH yet. There is an adjustment for the ash dump frequency on the UBB, but not on the 115. Each time fuel is added to the burn pot, a pre-set number is added to an internal counter on the Mother Board. When a preset number is reached, the stove goes into the ash dump mode sequence.

No matter the heat setting, the ash dump works off of the FEED RATE.

The Higher the Feed Rate...the sooner the ash dump.

The Lower the Feed Rate...the later the ash dump

(The Ash Dump frequency can be changed on the UBB.)

BURN POT AT BEGINNING OF THE ASH DUMP SEQUENCE

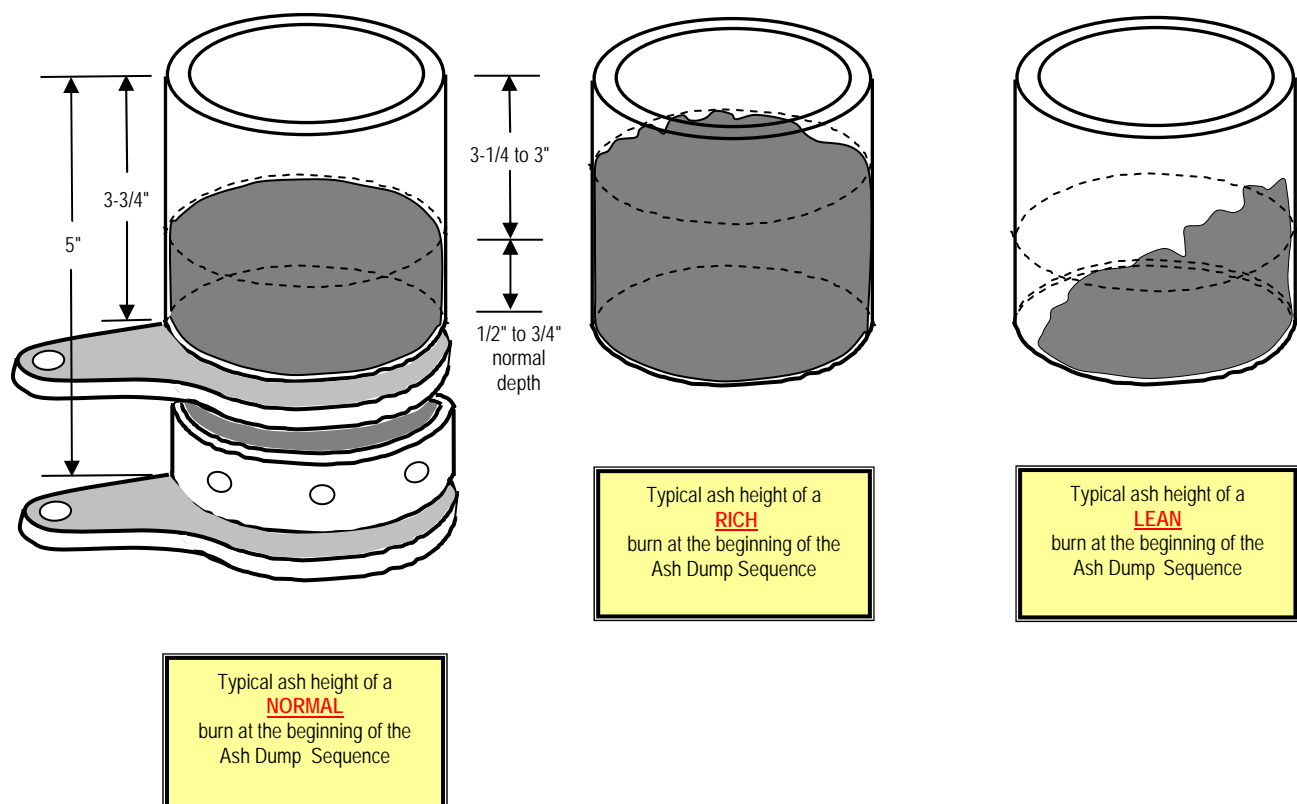


Figure 18 - Approximate Ash Height

Too Much Fuel

If the fuel in the pot is building up (getting higher in the pot than it should be), then the most probable cause is that there is either not enough air or there is too much fuel in the Burn Pot. The fuel level should be about the same height as the lower burn pot, during the first few hours of operation. Too much fuel will cause excess soot on the door glass and in the exhaust. If this is happening on all levels, then the feed rate Trim Pot should be turned down. Each notch is 6% of correction. The Trim Pot should be turned one notch at a time and run for a full dump cycle before the affects will be seen.

Not Enough Fuel

Another thing that can cause a build up of fuel in the Burn Pot is that there is not enough fuel. ***Unfortunately too much fuel and not enough fuel end with the same result, too much fuel in the Burn Pot.*** If there is not enough fuel, the fuel in the pot will burn too quickly, leaving only a small amount of burning fuel and a small flame. The fuel will still be dumping in at the same rate and not all of the fuel will be lit on fire. Eventually the corn that is not on fire, will catch on fire. The excess corn will create a larger than normal flame. The excess corn will be burnt up over time, since the stove is running in a lean condition. This scenario of not having enough fuel, will usually oscillate between a flame larger than it should be on that level and then back down to a small flame, before it gets bad enough to build up in the pot. This oscillation usually takes five to ten minutes per cycle. So if the flame gets very large, then very small, this is probably a case of not enough fuel. As corn is delivered to the Burn Pot, the flame will drop slightly in size and rise back up again, this is normal. Do not confuse this with the condition of not enough fuel.

Too Much Fuel? Not enough Fuel? Exhaust Leak?

To distinguish between having too much fuel or not enough fuel, the stove needs to be monitored prior to the build up.

If the Burn Pot slowly builds up with fuel, then it is probably getting **too much** fuel in the Burn Pot. The flame will also be slightly lazy and not quite as vigorous as normal.

If the flame oscillates and burns up most of the fuel in the pot, it is probably because there is **not enough** fuel in the Burn Pot. Half way through startup the stove will usually have a pretty small flame if this is the case.

The same symptoms of having **too much** fuel in the Burn Pot also show up if there is an exhaust leak.

The exhaust leak displaces some of the oxygen in the air and does not allow complete combustion. This is why sealing of the venting system is so important. Another possible cause of this scenario is that there is a blockage of the exhaust, which does not allow the exhaust out of the stove. Usually the exhaust blockage is from extremely dirty convection tubes, a dirty exhaust pipe that has soot built up, or an exhaust pipe or end cap that is corroded.

Exhaust Air and Intake Air Routing

The combustion air enters the stove through the outer pipe on the Bixby direct vent piping directly into the Converter Box. The direct vent pipe is actually a pipe within a pipe, the outer pipe is 5 inches in diameter and the inner pipe is 3 inches in diameter. The Converter Box keeps fresh combustion air separate from the combustion exhaust allowing the Bixby stove to use a direct vent piping system. This box diverts the fresh combustion air to the 3" intake hose that routes into the Ash Drawer compartment. Here the combustion air is then routed to the air wash channel, up through the 109 holes in the Lower Paddle and into the chamber created between the Upper Burn Plate and the Lower Burn Plate. The air in this chamber is pulled in through the Upper Burn Pot vortex holes aiding the combustion process.

The fresh combustion air in the Burn Pot is used in the combustion process and becomes exhaust. The exhaust rises to the top of the Firebox, past the convection plates and tubes and then into the Exhaust Tube in the back of the Firebox. The heat absorbed by the Convection Tubes is what heats the room air. The top rear of the Fire Box is open to the Heat Exchanger. Hot air, which rises, is pulled down into the Heat Exchanger towards the Exhaust Tube. This action allows the flow of the heated air time to provide excellent transfer of heat to the Convection Tubes. The exhaust is pulled through the Exhaust Tube by the Exhaust Fan. The Exhaust Fan blows the exhaust into the Converter Box where it goes into the inner 3" pipe of the direct vent system. The natural draw from the hot exhaust air exiting the stove and the Exhaust Fan are what drives the air movement. The combustion air is drawn in by the Exhaust Fan pulling out the exhaust. This can be accomplished because the MaxFire is a completely sealed system. If air is pushed out of the stove, then it must come in through the intake pipe since the rest of the system is sealed.

Convection System - Moving Hot Air

The convection air system transfers the heat from the stove, into the room. Room air is brought in through a Standard sized 16x16x1 Disposable Fiberglass Air Filter on the back of the stove. The 275 CFM convection fan blows filtered air up through the aluminized Convection Tubes, which are heated by the exhaust gas. The air which exits from the upper louvers is heated as it passes through the Convection tubes. The small amount of heated air that exits from the lower louvers is air that has passed through the Convection Tubes and past the sides of the Fire Box.

Computer control and sensors

The Bixby MaxFire is a thoroughly computer controlled stove. The computer program can be reprogrammed for future upgrades. The stove uses a “Motherboard” / “Daughterboard” combination. The Motherboard controls all of the stoves functions with exception for the igniters. The Igniters are controlled by the Daughterboard. Putting the Igniter circuitry on the Daughterboard keeps the high amperage circuits off of the Motherboard and allows the Motherboard to be protected by a small amperage fuse. Each Igniter is also protected by its' own fuse.

The Motherboard controls the stove in four running modes.

- a) **Start-up mode**
- b) **Normal running mode**
- c) **Ash Dump mode**
- d) **Shutdown mode.**

The approximate time breakdowns of the four operational modes are:

- | | | |
|----|------------------------|-------------------|
| a) | Start-up mode | 17 Minutes |
| b) | Normal Run mode | Indefinite |
| c) | Ash Dump mode | 1 Minute |
| d) | Shutdown mode | 30 Minutes |

Figure 19 - Running Modes and Times

Start-up Mode

The Start-up mode runs for approximately 17 minutes from the time the “On” button is pressed. The stove will first do a Diagnostic Test of its operation and test all of the sensors. The stove will also run the ash dump mechanism 3 times and move the feeder wheel to a position where there is a magnet over the feeder wheel sensor. If there are any problems they will be displayed as blinking lights on the control panel. These problems can be decoded from the chart in the Owner's Manual or from the chart on the Hopper_door. We will look at these dialogistic codes after we finish discussing all 4 running modes.

After the Diagnostic Test, the stove will start feeding corn into the Firepot, after a minute the air pump will Start-up. 15 seconds after the air pump starts, then the stove will test both igniters. After the test is done, then both igniters will be engaged. There should be a flame in roughly 3½ minutes from the point of starting the stove. If there is no flame within 10 minutes, the stove will shutdown and try to restart. The stove will try to restart 2 times before it flashes the #2 light (did not reach operating temperature) and shuts down.

When the stove lights normally, it will run at pre-set levels for the first 17 minutes. At the end of Start-up mode it will be on level 4, at which time, it will change to what ever level the user has set. The purpose of the Start-up procedure is to get the stove up to operating temperature and to stabilize the flame.

Normal Run Mode

During the normal running operation of the stove, the stove will run at the user preset level. If a different heat setting is chosen, it will take three minutes per level to ramp up or to the selected level. As shown in the following example, the two minute delay gives the stove time to adapt to the new feed and Exhaust Fan rates.

The feed rate and Exhaust Fan settings are modified by the Trim Pots. The Trim Pots can make changes plus or minus up to 30% in each direction. The stove will automatically do an ash dump after a preset amount of feed cycles. The higher the heat level setting, the shorter the time between ash dumps. Likewise, the lower the heat level setting, the longer the time between ash dumps (**Figure 4 - Approximate Burn Times**).

Ash Dump Mode

In the Ash Dump Mode, the stove will feed in extra corn before the Burn Drive Motor activates. This will ensure that there are enough flaming embers to slice off during the ash dump. During the Ash Dump Mode, the stove runs normally but with an added function. The burn drive motor activates, moving both the Upper and Lower Paddles simultaneously. As the Upper Paddle rotates to the Ash Dump position, the Upper Paddle will slice off the burning embers from the top of the Clinker. The burning embers stay above the Upper Paddle maintaining a fire in the Upper Burn Pot. The Wedge on the bottom of the Upper Paddle forces the Clinker down into the Ash Drawer as the Upper Paddle rotates to the dump position. Simultaneously, the Lower Paddle has rotated so its' one large hole is positioned over the Lower Burn Plate hole. This allows the Clinker to fall out of the Lower Burn Pot and into the Ash Drawer. When the Upper and Lower Paddles return to the normal run position, the embers that were sliced off by the Upper Paddle will drop back into the Lower Burn Pot. The stove is now in the Normal Run Mode.

Shutdown Mode

The final mode is the Shutdown Mode. The Shutdown Mode is entered when the "Off" button is pressed or an error is found by the mother board. The stove will stop feeding corn and increase the Exhaust Fan speed to keep all of the combustion exhaust going out the exhaust pipe. The stove will run at this speed for 10 minutes to allow time for all of the fuel to burn. After this 10 minute period, the Exhaust Fan will run at 50% and Convection Fan will decrease in speed for 20 minutes more. At the end of this 30 minute period, the stove will do an Ash Dump and completely shutdown.

Electrical Components

The Motherboard uses 8 sensors to control the various stove functions:

- 1) Feeder Wheel Sensor
 - 2) Exhaust Fan Tachometer
 - 3) Ash Drawer Switch
 - 4) Door Switch
 - 5) Exhaust Thermocouple
 - 6) Burn Drive Motor Limit Switch
 - 7) Hopper Snap Disc
 - 8) Igniter Current Sensing Coil
-
1. A Magnetic Sensor below Feeder Wheel senses 4 magnets that are pressed into the Feeder Wheel as the Feeder Wheel rotates. The stove will reposition the Feeder Wheel so each hole will align in the correct position at the proper time.
 2. The Exhaust Fan Tachometer gives the stove's computer feedback as to the actual speed of the fan. This also is used to determine if the Exhaust Fan is working correctly. The Exhaust Fan uses this input to run an exact speed.
 3. The Ash Drawer Switch lets the stove know if the Ash Drawer is in the closed position or not. If the Ash Drawer is not in the closed position, it will cause an error (#5 light blinking) and the stove will not do an ash dump. Eventually fuel will build up in the Burn Pot if the Ash Drawer is not replaced or closed properly. After 20 minutes the stove will shut down to prevent a build up of unburnt fuel.
 4. The Door Switch tells the stove if the door is closed or open. If the door is open, it will cause an error (#4 light blinking) and will shutdown in one minute.
 5. The Exhaust Thermocouple is used to measure the temperature of the exhaust. The Thermocouple is also used to adjust the Convection Fan speed. If the temperature of the exhaust is getting too hot (losing efficiency), the Convection Fan will speed up to put more heat into the room. The increase in the Convection Fan speed will aid in lowering the exhaust temperature. If the exhaust temperature continues to rise to a critical temperature, then the stove will move itself to a lower heat level setting until the exhaust temperature has lowered. If the temperature still does not come down, then the stove will shut down with a #3 light blinking.
 6. The Burn Drive Limit Switch gives indication to the stoves computer that the paddles are in the run position and the ash dump worked correctly. The switch is activated by a cam that is on the burn drive motor.
 7. The Hopper Snap Disc is another safety device that senses the temperature of the bottom side of the Hopper. The #3 light will begin blinking if the Snap Disc has been activated and the stove will shutdown. The Snap Disc will automatically reset as the stove cools.

8. The Igniter Current Sensing Coil checks both igniters for current draw before the stove starts up. If either of the igniters is bad, the stove will show an error code. The Left Igniter, as you look at the stove, will have the #7 & #1 lights blinking simultaneously, the Right Igniter will have #7 & #2 blinking simultaneously. If both Igniters are bad, lights #7 & #1-2 will blink. Unplug each Igniter and check with an ohmmeter to verify that the Igniter is bad. The resistance of a good Igniter will be 22 to 28 ohms.

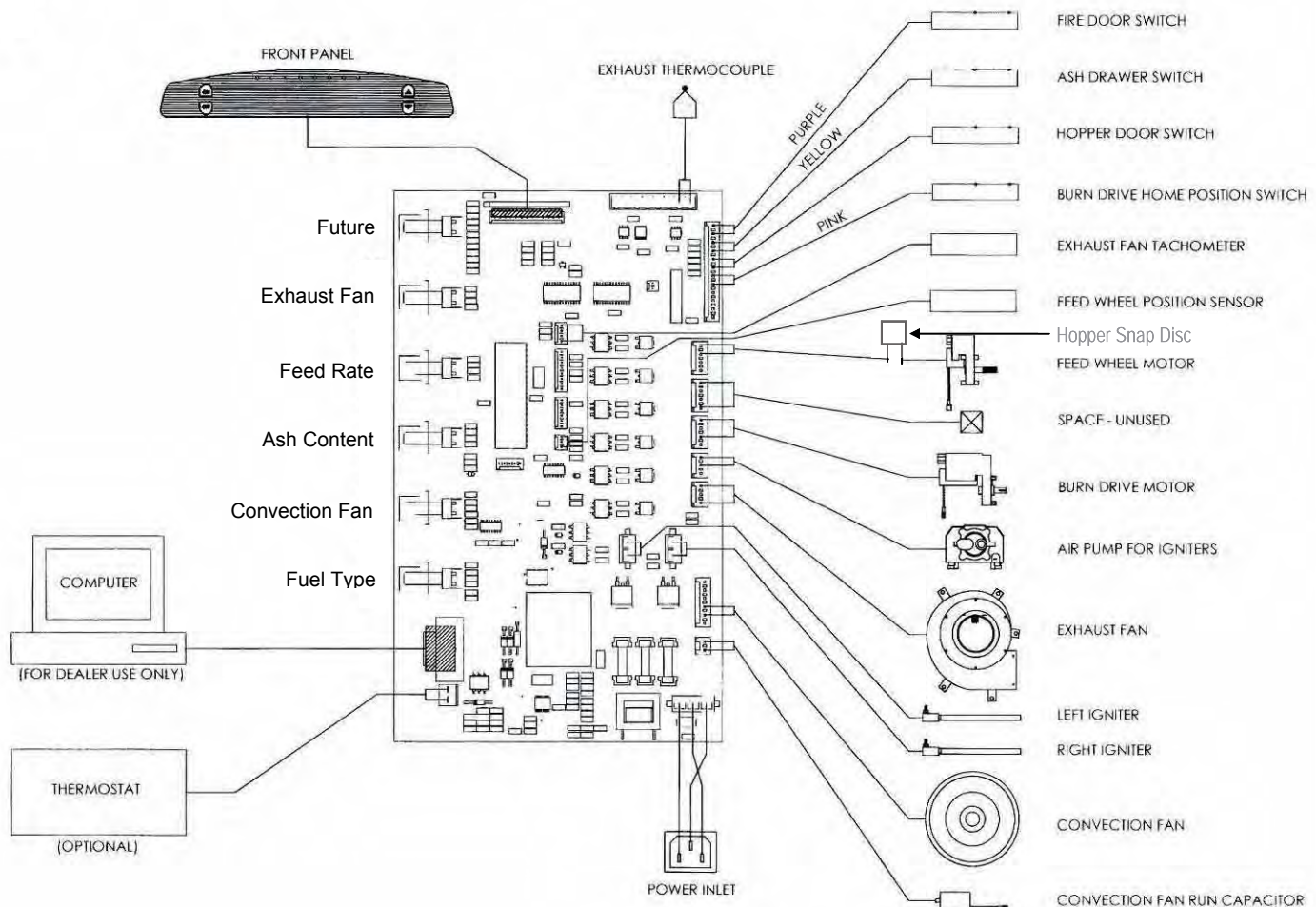
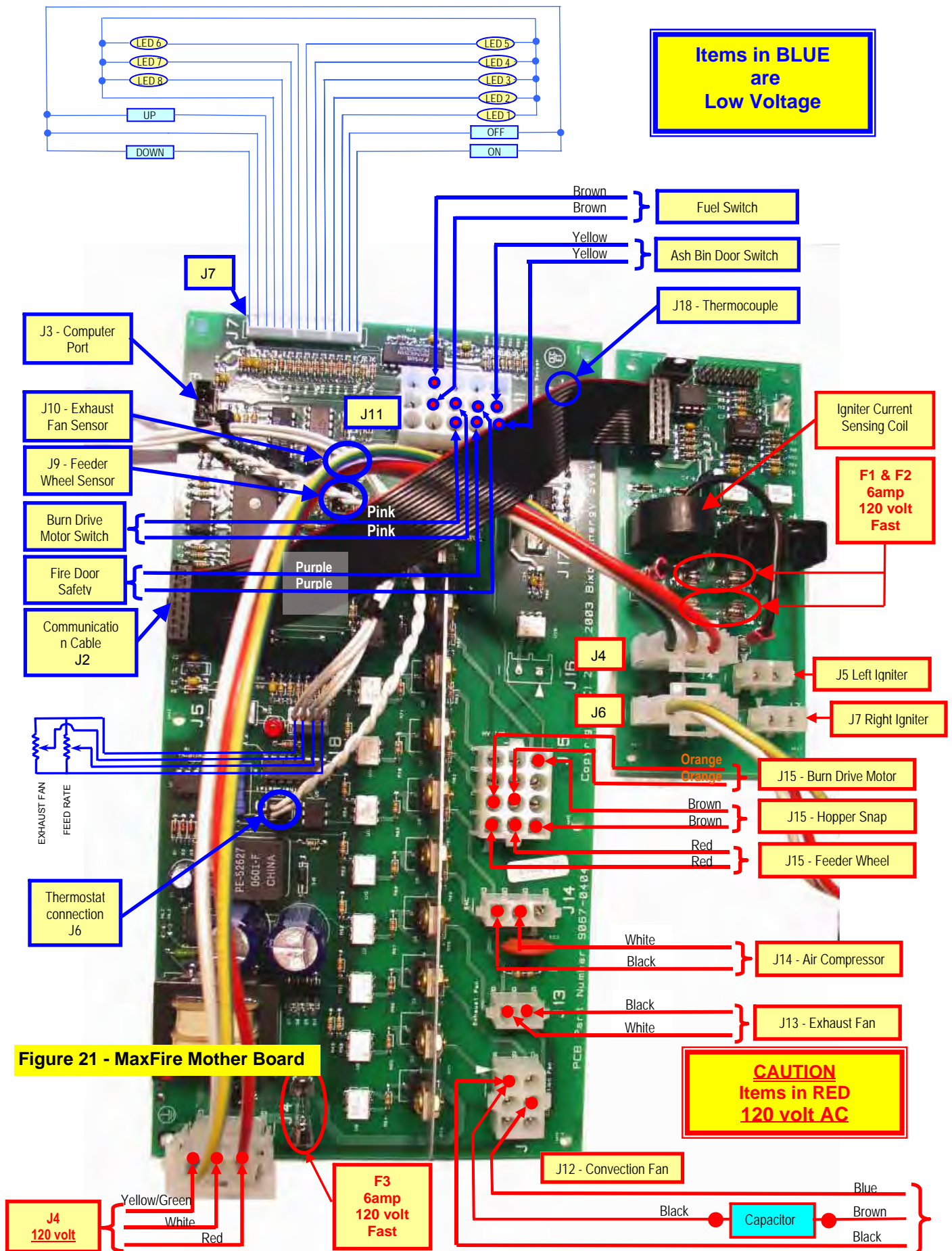


Figure 20 - UBB Mother Board



Care and Cleaning of the Bixby MaxFire

Keep in mind that the Bixby burns corn, a bio mass fuel that comes with fines and other impurities and produces a 'Clinker.' The stove is 99.7% combustion efficient; meaning 100 pounds of corn will burn down to 1 pound of ash. The Ash Drawer needs to be cleaned regularly to ensure proper functioning of the stove. The frequency of emptying the Ash Drawer depends on the heat setting and how long the stove is running. At maximum heat output (heat setting 8) and running continuously, you will need to empty the Ash Drawer every 2 days. However, at lower heat settings (2-4), or running the stove only a few hours a day, you will only need to empty the Ash Drawer every few days. After a maximum of 3 hopper fills, dump the ash drawer.

The best rule of thumb is to simply empty the Ash Drawer every time you fill the Hopper.

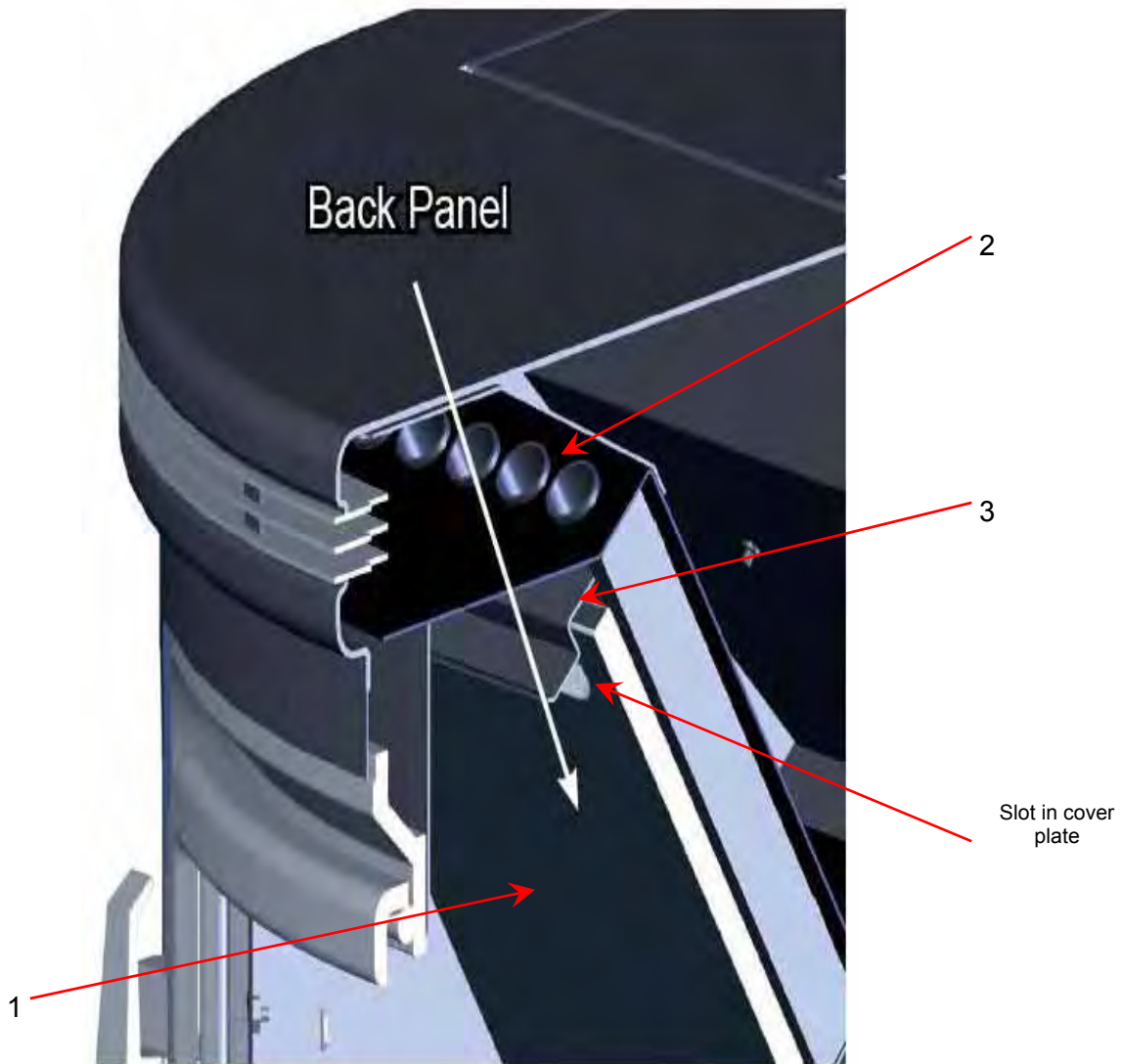
Weekly

The Heat Exchanger is at the back of the Fire Box and consists of:

- 1) Convection Tube Cover Plates
- 2) Convection Tubes
- 3) Rear panel of the Heat Exchanger
- 4) Convection Tube Scrapers

To maintain the stove's maximum output efficiency, the Convection Tubes must be kept as clean as possible. The majority of the heat supplied by the stove comes through the Convection Tubes heated by the combustion exhaust. The stove has 2 Scrapers built around the Convection Tubes. The Convection Tubes are located in the back of the Firebox behind the Convection Tube Cover Plates (**Figure 22 - Heat Exchanger Components**). To remove the Convection Tube Cover Plates; Raise the Scraper and the Convection Tube Cover Plate upward at the same time. This will allow the cover plate to fall out of the bottom channel. Lower the cover plate moving the bottom to the rear. This will allow the top to fall forward for removal. Remove the Convection Tube Cover Plates from the Fire Box. The Scrapers, (**Figure 22 - Heat Exchanger Components**), need to be run up and down several times once a week. This cleans the soot off of the Convection Tubes and allows for maximum efficiency of heat transfer into the convection air system. Doing this on a weekly basis will make this job an easy task. Not scraping the Convection Tubes weekly could cause a buildup on the Tubes that could require quite a bit hard work to remove and eventually impede the exhaust flow.

Soot from running the Tube Scrapers up and down the Convection Tubes will build up at the bottom of the Convection Tubes in the Heat Exchanger. Use an ash vacuum to remove the ash around and at the bottom of the Convection Tubes and on the Convection Tube Cover Plates. If this is not done, it can block exhaust flow. A blocked exhaust flow will cause the stove to burn rich and create even more soot and can lead to a build up of un-burnt fuel in the pot. Also at this time the top of the upper burn plate needs to be vacuumed. Lift or remove the Upper Burn Plate to vacuum the area under the Upper Burn Plate. When all is completed and before closing the firebox door, clean the inside and outside of the glass using any good glass cleaner. The stove is now ready to be put back in service.



- 1) Convection Tube Cover Plates
- 2) Convection Tubes
- 3) Convection Tube Scrapers

Figure 22 - Heat Exchanger Components

Monthly

Do the weekly cleaning plus the following:

Lift or remove the Upper Burn Plate to vacuum the area under the Upper Burn Plate. Reinstall the Convection Tube Cover Plates in the reverse order they were removed.

Also, ***once a month*** you need to clean the holes in the Lower Paddle (**Figure 9 - Lower Paddle**). Visually confirm that the lower paddle is in the run position. ***Unplug the stove!*** Remove the Ash Drawer. On the ceiling of the Ash Drawer Compartment you will be able to feel the bottom of the Lower Paddle (there will be numerous holes). With a 1/8" drill bit or a 1/8" allen wrench press it through the holes in the paddle, working your way from one side to the other, row by row. This will clean any debris out of the air holes in the Lower Paddle. With an ash vacuum, clean the Burn Pot of any debris you may have pushed up and into the Burn Pot.

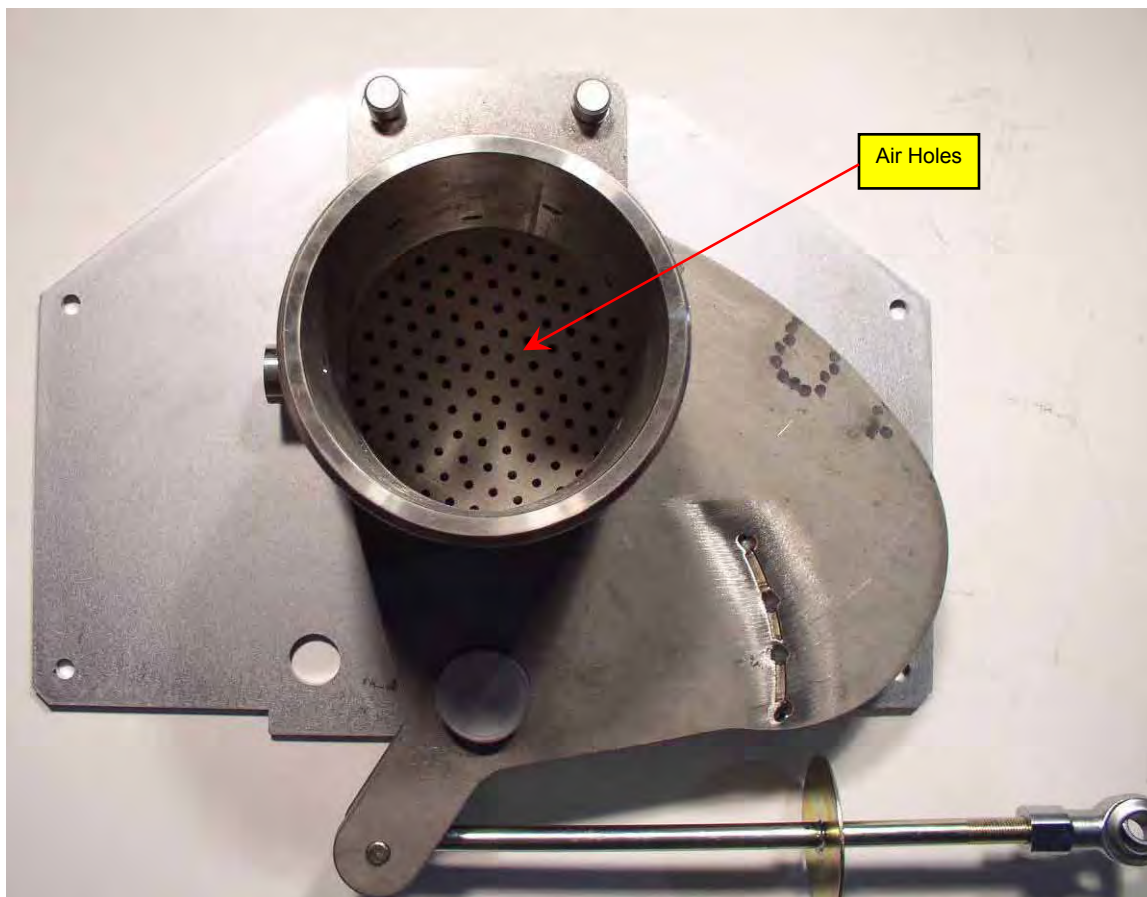


Figure 23 - Lower Paddle Air Holes

Annually

The rest of the routine maintenance only needs to be done once a year, at the end of the heating season.

Remove the convection plates and do the weekly and monthly maintenance (see previous pages).

The Exhaust Fan will need cleaning (**Figure 24 - Exhaust Fan Clean Out**). Take off the right side panel of the stove (one Phillips head screw at the top center of the side panel) and behind that you will see a rectangular cover with 10 silver screws facing towards you. That is the exhaust clean-out. Remove the 10 silver screws, the plate, and carefully scrape any ash off of the fan blades that are inside. Now vacuum up any ash in the exhaust housing.

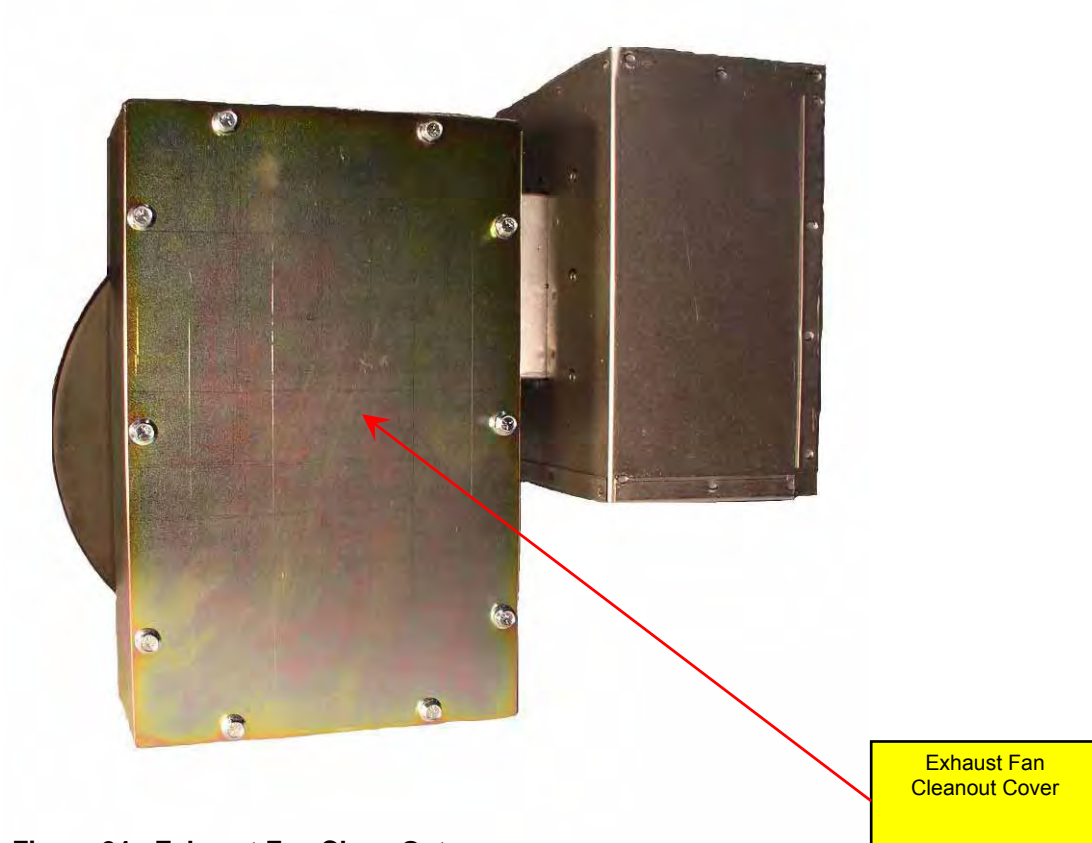


Figure 24 - Exhaust Fan Clean Out

Replace the 16x16x1 Air Filter on the rear of the stove.

Finally you will also have to do a chimney sweep at the end of each heating season. If you have horizontal venting with no bends, then you will be able to vacuum out the pipe by just removing the end cap. A good pellet stove brush, one with nylon bristles, and flexible rods will be a big aid in cleaning the venting. ***All installations must vacuum out all horizontal runs.*** Remember, biomass and corns are solid fuels so there will inherently be soot in the exhaust. It is important to do this ***soon*** after the heating season is over to be prepared for the coming heating season.

When the heating season comes around again, the stove will be set to go without doing any maintenance.

Dealers should contact their Bixby stove customers every spring and offer this annual cleaning service. The cleanings are a good way to get annual income and it is also a good time to do a follow up with all of your Bixby customers.

Safety First

Common sense is important when thinking about the placement and use of the Bixby Room Heater in your customer's homes. Also see the Owner's Manual for any other Safety concerns. The following safety tips need to be taken into consideration.

1. Contact local authorities having jurisdiction over room heater use, restrictions, permits, and inspection criteria in your customer's area. The Bixby stove should only be installed in accordance with Bixby authorized installation and operating instructions.
2. Venting. Have customers refer to venting instructions and local codes for precautions required for passing the vent pipe through a combustible wall or ceiling and for acceptable locations of the vent.
3. **Do not, under any circumstances,** install a flue damper in the exhaust venting system of this unit. **Do not** connect the stove to a chimney serving another appliance.
4. Placement – the stove and venting needs to be installed away from doors and windows – minimum clearances are shown in **Figure 26 - Clearances for the MaxFire, Figure 26 - Clearances for the MaxFire, Figure 27 - Clearances for the UBB**

Vent Locations: and **Figure 28 - Venting Locations.**

5. The Bixby MaxFire is designed for use with whole cleaned and dried corn kernels. Wood pellet fuel and other pelletized biomass fuels may be used if they meet the manufacturer's fuel standards for the MaxFire.
6. Do not burn garbage, or flammable fluids such as gasoline, naphtha or engine oil in the Bixby room heater. Tell customers no fuels should be stored near the stove.
7. Always unplug the heater before cleaning or servicing the stove.
8. Surge protection is recommended for the heater to protect the stove. In general, 200 joules will give you basic protection; 400 joules provide good protection and anything with over 600 joules can be considered exceptional. It is always recommended to use surge protection when a generator is being used with the Bixby Room Heater.
9. Dispose of all ashes in a metal container.
10. The use of a protective screen (fireplace screen) is recommended with children and pets present. Bixby offers a protective screen for the stoves door. Combustible materials should be kept at least two (2) feet away from the room heater.
11. A hearth pad is recommended to protect the stove surface and may actually be required in some jurisdictions for safety.
12. Although the stove emits almost no carbon monoxide, a carbon monoxide indicator as well as a smoke detector should be installed as early warning indicators.
13. The Bixby stove should never be installed in a sleeping room.
14. When working on the interior of the stove, ALWAYS remember there is exposed 120vac inside the stove when the stove is plugged in.
15. If the stove is to be installed in a work shop, it needs to be a minimum of 18" off the ground from the bottom of the stove.

Installation

IMPORTANT:

Proper material handling equipment must be available to safely transport and position the Bixby Room Heater.

1. Remove the protective packaging, using appropriate tools, and detach the unit from its shipping pallet. The Room Heater is attached to the pallet with two bolts. Remove the side panels to gain access to the bolts.
2. Using a suitable transporting device, move the unit to the desired location, centering it on the Bixby Hearth Pad or an alternate protective plate. Care should be taken not to mar the Hearth Pad. Placing protective material under the Bixby Room Heater when positioning is recommended to prevent surface damage..
3. Use the included bulls-eye level to level the unit by adjusting the height of its legs. Leveling the unit is required to maintain even fuel distribution of fuel in the burn pot.

Heater Location and Clearances:

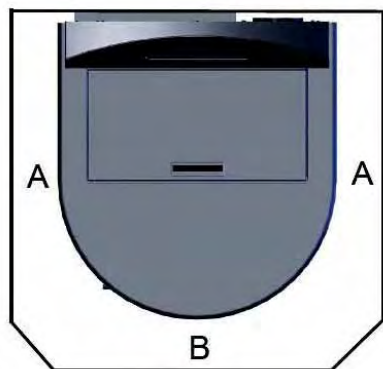
The Bixby Max-Fire™ Room Heater is intended for use in buildings, manufactured homes or for mobile home installation mobile home installation

CAUTION: The Max-Fire™ Room Heater should not be installed at a location where it could come in contact with curtains, drapes, walls, carpeting or other combustible surfaces. The Room Heater must not be installed in a sleeping room. When choosing a location, proximity to an electrical outlet (do not use an extension cord) and the best location for the venting outlet and its connecting piping should be considered.

CAUTION: This Room Heater must be installed only by an authorized dealer, and / or by individuals who are technically qualified and versed in any local codes or regulations that may apply to installation and application of heating equipment of this type. Clearances specified in this manual are minimal and any reduction must be approved by the regulatory authority.

CAUTION: To assure safe operation, it is absolutely essential that a floor protective device of metal or other non-combustible material be in place beneath the Room Heater.

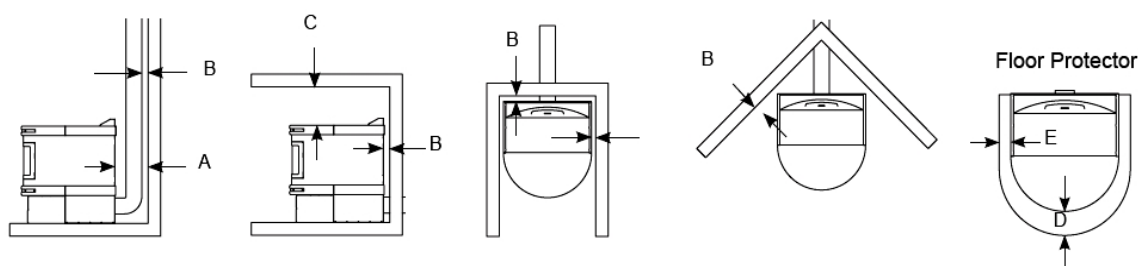
MaxFire Clearances:



The non-combustible floor protector should extend a minimum of 2 in. (50.6mm) out from each side of unit when installed in a free standing location and 6 in. (152 mm) in front of Room Heater door.

Figure 25 - MaxFire Floor Protector

A= 3 in. (76mm)
B= 6 in. (152mm)



Free Standing and Alcove (rear only) Installation Clearances:

A	10.5" (267mm)	D	6" (150mm)
B	2" (50mm)	E	2" (75mm)
C	12" (305mm)		

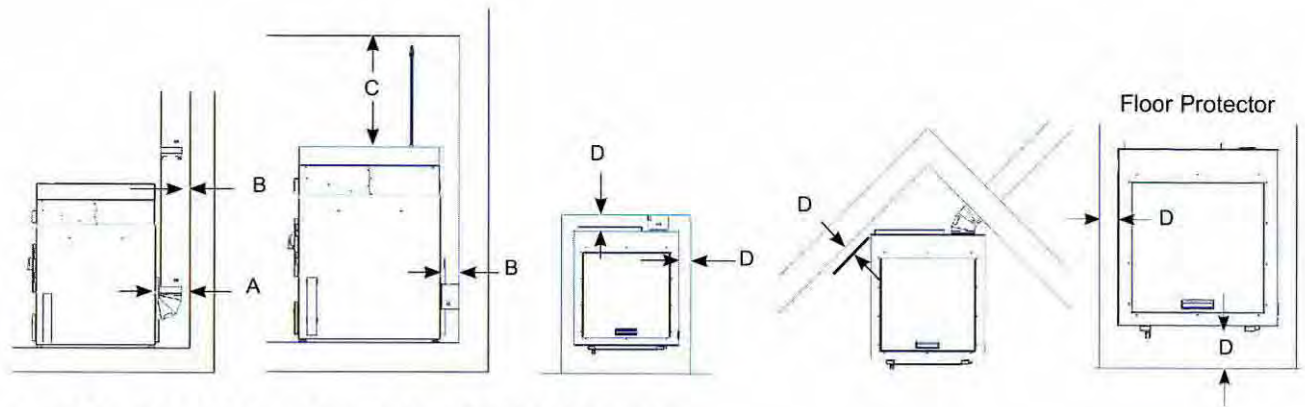
NOTE: Minimum clearances are for temperature concerns and do not allow for enough room for maintenance. Please allow enough room on the sides for routine maintenance, 6" - 12" (150mm - 305mm) of clearance to non-movable objects (i.e. walls) is recommended. Also, clearance to the back of the Room Heater is needed for replacement of the filter.

Alcove Dimensions (Rear Vent Only):

Minimum Height - 42" (1065mm), Minimum Width - 32" (815mm),
Maximum Depth - 24" (610mm)

Figure 26 - Clearances for the MaxFire

UBB Clearances:



Free Standing and Alcove (rear only) Installation Clearances:

A 10.5" (267mm)
 B 2" (50mm)
 C 22" (560mm)

D 6" (150mm)

NOTE: Minimum clearances are for temperature concerns and do not allow for enough room for maintenance. Please allow enough room on the sides for routine maintenance, 6" - 12" (150mm - 305mm) of clearance to non-movable objects (i.e. walls) is recommended. Also, clearance to the back of the UBB is needed for replacement of the filter.

Use a non-combustible floor protector under the unit, extending 6" (150mm) past the side of unit (or less if installed at closer clearances) and 6" (150mm) in front of UBB door.

Alcove Dimensions (Rear Vent Only):

Minimum Height - 62" (1575mm), Minimum Width - 35.5" (902mm),
 Maximum Depth - 24" (610mm)

Figure 27 - Clearances for the UBB

Vent Locations:

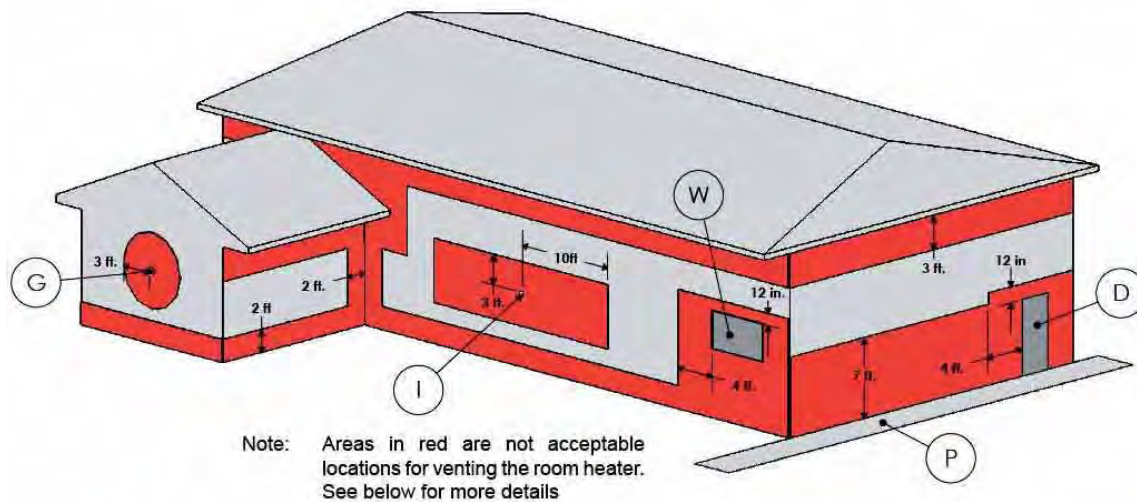


Figure 28 - Venting Locations

Follow the below listed NFPA rule for distance of exit terminal from windows and openings:

Per NFPA 211 10.4.1 all vents shall terminate above the roof surface (vertical venting). However, per NFPA 211 10.4.5, Mechanical draft systems shall not be required to comply with 10.4.1 provided they comply with the following:

To ensure compliance with NFPA 211, the vent, shall be located in accordance with the following:

- Not less than 3 ft. (.91m) above any forced air inlet (**I**) located within 10 ft. (3m).
- Not less than 2 ft. (.61m) above grade, non combustible material ground cover is recommended below the vent if less than 3 ft. (.91m) above grade.
- Not less than 4 ft. (1.2m) below, 9" minimum. (.225m) horizontally from or 1 ft. (.3m) above any door (**D**), window (**W**) or gravity air inlet into any building.
- Not less than 2 ft. (.61m) from an adjacent building and not less than 7 ft. (2.1m) above grade when located adjacent to public walkways / paths (**P**).
- Not within 3 ft. (.91m) of a gas service regulator vent outlet (**G**).
- Not above a gas meter/regulator within 35 in. (.9m) horizontally of the vertical center line of the regulator (**G**).
- Not less than 3 ft. (.91m) below overhang (i.e. roof)

Mobile Home Installation

WARNING: DO NOT INSTALL IN A SLEEPING ROOM.

CAUTION: THE STRUCTURAL INTEGRITY OF THE MOBILE HOME FLOOR, WALLS AND CEILING / ROOF MUST BE MAINTAINED
(i.e. Do not cut through floor joists, wall studs, ceiling trusses, etc.)

1. A Bixby Direct-Vent system must be used to provide an outside air inlet for combustion air and must be unrestricted.
2. The Room Heater must be secured to the mobile home by bolting it to the floor (using lag bolts).
3. The Room Heater must be grounded per the current NEC 550.16(B)(3) (National Electrical Code.) This is accomplished by means of the stove's power cord. The cord MUST plug into a "grounded receptacle."
4. Refer to page **47** for a typical vertical or page **51** for a typical horizontal mobile home venting installation.
5. Refer to clearances to combustibles section on pages **35 & 36** for distances to combustibles and page **37** for appropriate chimney system locations.
6. Seal all wall and floor inlets to prevent air or moisture penetration. Check periodically to ensure inlet is free of obstruction, such as snow and ice.
7. Installation should be in accordance with the Manufactured Home and Safety Standard (HUD), CFR 3280, Part 24.

* * * * *

Performing the Installation:

The unit is shipped completely assembled. It is enclosed in protective packaging material and attached to a shipping pallet. A shop cart or other suitable material handling device (minimum capacity of 400 lbs. (180kg)) will be needed to transport the Bixby Room Heater to its desired location. To bring the Room Heater into the room chosen, a door opening of at least 2 ft. 8 in. (80cm) will be needed. Appropriate tools will be needed to connect the venting pipes and fittings, as well as a hole-cutting device for venting the piping to the outside.

The Bixby Heater should be set in its' final location BEFORE any measurements for openings to the outside are cut. If a floor protector of any type is to be set under the stove, it will raise the height of the center of the opening. Thus, when measuring for the opening, the stove MUST be at its' final height and level. If this is not done, the horizontal pipe will angle down and away from the stove.

The Bixby Stove should be leveled BEFORE attaching the vent pipe. Use the supplied bulls' eye level supplied with the stove or a 6" torpedo level. The stove must be leveled front-to -back and side-to-side.

1. Place the level centered side-to-side and about 4 in. (10cm) back from the front of the Room Heater on the top surface. The bubble should end up centered inside the middle circle on the level. If the bubble is not in that position, the bubble will be towards the high side of the Room Heater. See figure below.



Figure 29 - Location of Bubble Level

2. Locate the leveling feet on the bottom of the Room Heater.

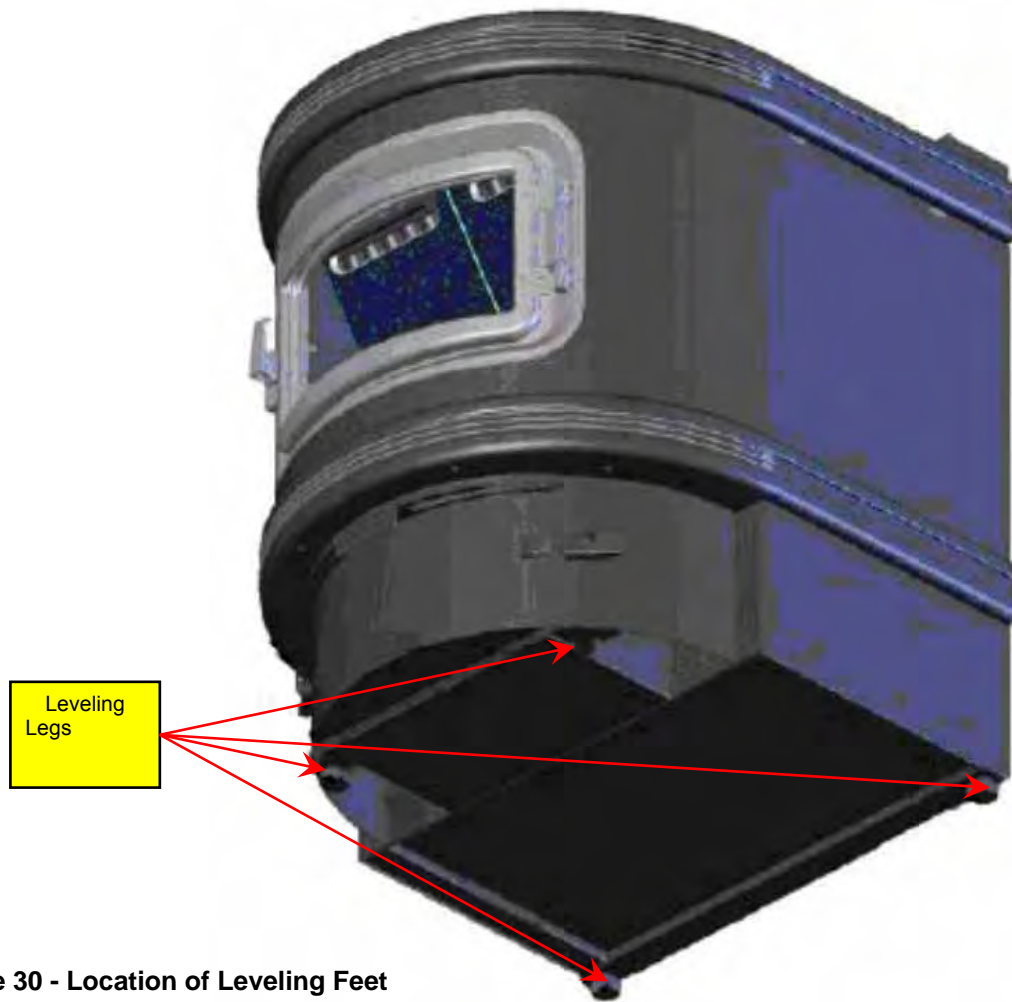


Figure 30 - Location of Leveling Feet

3. Lift the Room Heater near the foot to be raised (low side, opposite the bubble on the level). A pry bar with a wooden shim or something similar under it, to protect the hearth pad, can be used to lift the Room Heater
4. With the corner of the Room Heater elevated, place a piece of wood (or other blocking) under the Room Heater to hold it while adjusting the leg. The leg length should be adjusted by hand, but if needed a wrench maybe used. This will not work if the foot is turned all the way in, as that portion will not be accessible.
5. Remove the block using the pry bar and check adjustment.
6. Proceed to adjust the feet until the bubble is centered inside the inner circle. This is a very important step as the feed system is gravity fed and it will ensure that the fuel is fed Into the burn pot correctly.

Optional Thermostat Operation:

The Room Heater is designed so that it can be operated by a wall mounted thermostat. This option is not provided directly from the factory, but can be purchased from your dealer or the Bixby website (www.bixbyenergy.com) or any other "on/off" 24vac wall mounted thermostat can be used. **Do not use a powered thermostat to avoid damage to the Room Heater.** Follow the thermostat installation instructions carefully.

NOTE: Thermostat should be mounted on an inside wall and not in direct line with the Room Heater convection air. A preferred location would be on an inside wall opposite the Room Heater.

When the thermostat is hooked up and calling for heat, the Room Heater will display the currently selected level using the LED's. If the thermostat is NOT calling for heat, the currently selected level will be displayed, but all the LED's will be slowly flashing in unison and the Room Heater run at level 1.

Thermostat Installation Instructions

1. Unplug the Room Heater.
2. Remove the left side panel.
3. Locate the Trim Pot / Thermostat bracket.
4. Loosen the middle two screws on the thermostat block and remove the metal jumper.
5. Run the wire for the thermostat through the opening for the air filter.
6. Attach the wires of the thermostat to the two terminals.
7. Replace the side panel.



Figure 31 - Thermostat Terminals Location

Venting Installation and Instructions

WARNING:

A major cause of vent related fires is failure to maintain required clearances (air spaces) to combustible materials. It is of the utmost importance that this vent system be installed only in accordance with these instru

tions.

Permits:

Contact your local building officials, fire officials, or the authority having jurisdiction about restrictions, permits, and inspection requirements in your area.

Inspections:

The use of pelletized fuel does not eliminate the need for inspection and cleaning. During the heating season, inspect monthly

Vent system Approvals:

BIXBY DIRECT VENT PIPE is listed by OMNI-Test Laboratories, Inc. as a vent for BIXBY pellet and corn Room Heaters only. NO OTHER PIPE IS LISTED FOR USE WITH BIXBY ROOM HEATERS. The use of non-Bixby vent pipe will void the Room Heater's warranty. The minimum clearance from this vent to combustible materials is 2 in. (50mm). Combustible materials include but are not limited to lumber, plywood, sheetrock, plaster and lath, furniture, curtains, electrical wiring, and building insulation of any kind. NEVER fill any required clearance space with insulation or any other materials.

This vent pipe is tested and listed by OMNI-Test Laboratories, Inc. to UL Standard 641 and to ULC/ORD-C441 (Canada) for safe low temperature venting systems, Type L, and produced under the factory inspection and follow-up program of OMNI-Test Laboratories, Inc.

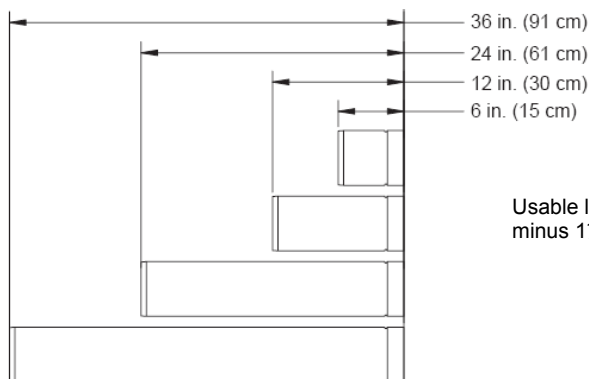
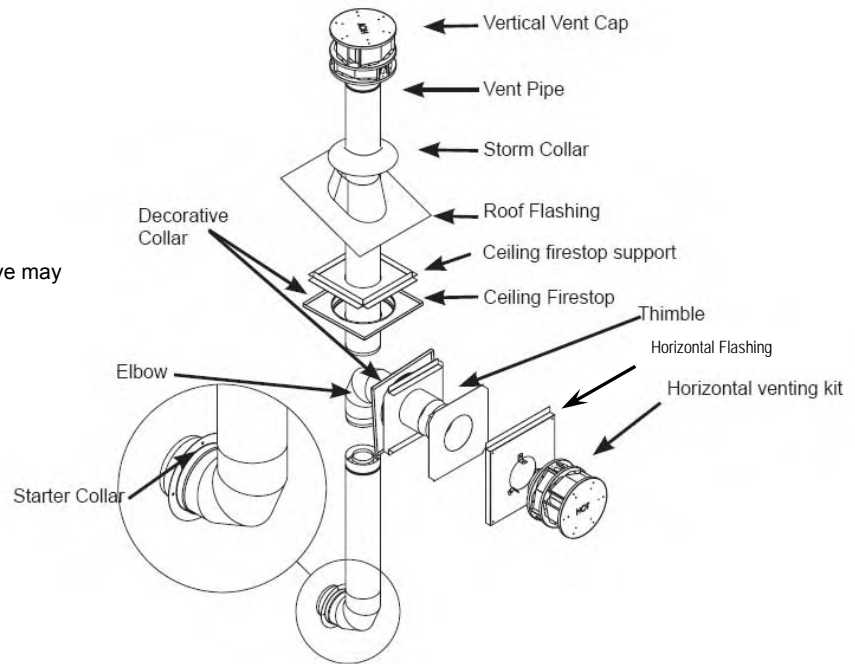
NEVER INSTALL SINGLE-WALL PIPE TO THE Room Heater.

NOTE:

Proper planning for your vent installation will result in greater safety, efficiency, and convenience, saving both time and money. Use only authorized BIXBY ENERGY SYSTEMS, INC. listed parts. Do not install damaged parts.

Venting Components

Exhaust Temperatures at rear of Stove may be aprox. 300° - 350° F



Usable length of pipe is pipe length minus 1½"

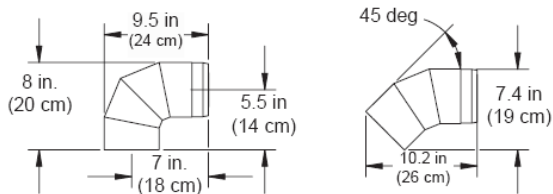


Figure 32 - Venting Components

CAUTION:

The Room Heater should be leveled before attaching the vent pipe.

See page 30 for leveling information.

Where passage through a wall or partition of combustible construction is desired, the installation shall conform to CAN/CSA-B365.

The vent **MUST NOT** connect to any air distribution duct or system, or exhaust into an enclosed or semi-enclosed area, but directly to the outside. Termination in a garage, attic, crawl space or other location in which fumes can accumulate must be avoided. The installation with the vent extending vertically through the roof of the building must have the proper termination cap installed. See specific venting instructions for more information.

Because solid fuel produces ash, Bixby Energy Systems is not responsible for flue by-products that might damage or discolor building structures (walls, floors, roofs, etc.). If the vent is to be installed inside an existing masonry chimney or other unheated structure (or if excessive condensate forms), it is recommended that the pipe be insulated with non-combustible insulation (such as calcium silicate).

Venting Configurations

The allowable venting configuration is to be 25 equivalent feet (7.5 m) or less as determined through the following table:

Type of Pipe	Qty		Factor (ft)	Total
90 deg elbow		x	5 (1.5m)	
45 deg elbow		x	3 (0.9m)	
Horizontal Pipe		x	2 (0.6m)	
Vertical Pipe		x	0.5 (0.15m)	
Altitude (in thousands of feet)		x	2.5 (0.8m)	
			Total	

Example Calculation:

Type of Pipe	Qty		Factor (ft)	Total
90 deg elbow	1	x	5	5
45 deg elbow		x	3	
Horizontal Pipe	1	x	2	2
Vertical Pipe	20	x	0.5	10
Altitude (in thousands of feet)	2	x	2.5	5
			Total	22

Figure 33 - Venting Configuration Calculations

NOTE: Horizontal runs, should be minimized (48 in. (1.2m) maximum per section) to prevent the accumulation of ash. If possible replace horizontal offsets (two 90 degree elbows) with 45 degree offsets (two 45 deg elbows) to go around building structures.

Approximate Location of Stoves Exhaust

The exhaust is located on the back of the stove. See **Figure 34 - Approximate Stove Exhaust Dimensions**.

NOTE: If a hearth pad is used, ADD the height of the hearth pad to the height of the exhaust penetration location from the base, or measure from the top of the hearth pad with the pad in place.

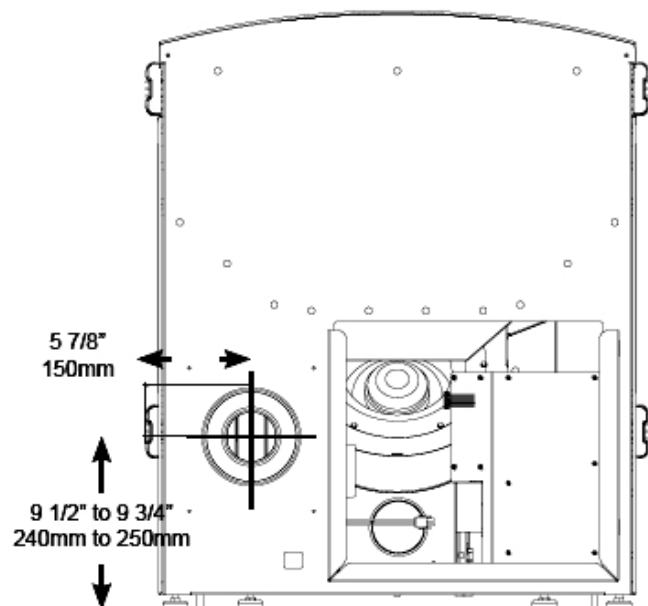


Figure 34 - Approximate Stove Exhaust Dimensions

General Vent Installation Instructions

Connect only BIXBY ENERGY SYSTEMS DIRECT VENT to BIXBY ROOM HEATERS.

CAUTION:

Connect only one flue per appliance.
Do not install a flue damper in the exhaust venting system of this unit.
Do not connect this unit to a chimney flue serving another appliance.
Over firing (too much fuel) can damage the Room Heater, vent pipe, or surrounding structures.

*

The use of three (3) sheet metal screws (self-tapping screws are recommended) is required at every connection. Do not use longer than 3/4 in. (20mm) screws to prevent damage to the inner pipe. The indents in the pipe will assist in the placement of the screws.

*

High temperature (500F/260C) silicone sealant is required on all 3 in. diameter inside joints. Either high temperature or clear silicone sealant is recommended for the outer 5 in. outside joint. A 1/8 in. (3mm) bead, 1/2 in. (12mm) from the male (crimped) end of both sections of pipe is recommended. See Figure 35 - Venting Silicone Sealant. *Never use 1200F –1300F sealing cement.*

*

The joint is not sealed unless the seam between the two outer sections of pipe is tight and the indent locks into the groove.
See **Figure 36 - Venting Indent Locks** and **Figure 38 - Venting - No Visible Gaps.**

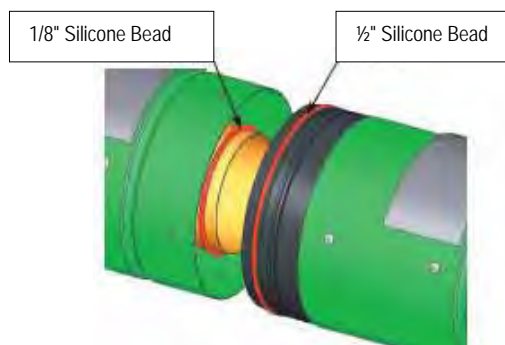


Figure 35 - Venting Silicone Sealant

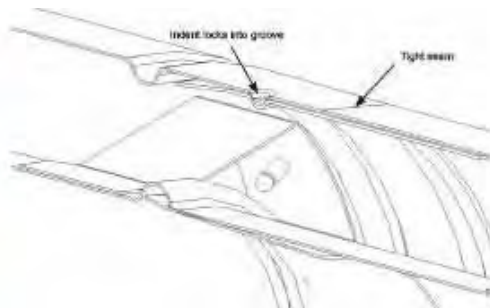


Figure 36 - Venting Indent Locks

WARNING: ALWAYS MAINTAIN AT LEAST 2 in. (61mm) CLEARANCE FROM COMBUSTIBLE MATERIALS.

Where the chimney passes through additional floors and ceilings always install a firestop / Support.

Vertical Interior Installation

NOTE: Vertical exterior installation is not recommended due to excessive condensation.

NOTE: Bixby recommends not installing a venting system in a pipe chase or permanent wall structure (other than to exit the room using the Wall Thimble). Vent pipe should be accessible for annual inspection and maintenance. Bixby is not responsible for damages to pipe chases, or other wall structure resulting from vent failures.

The flue exit is on the back of the Room Heater and if vertical interior installation is desired:

1. Place the Room Heater according to the installation instructions. See Figure 28 - Venting Locations for vent locations.
2. **Connect a Starter Collar to the back of the Room Heater using four (4) screws. See**

Figure 37 - Venting Starter Collar

3. Insert an Elbow through the Starter Collar, into the back of the Room Heater. Align and push together until snapped into locked position. See Figure 29.

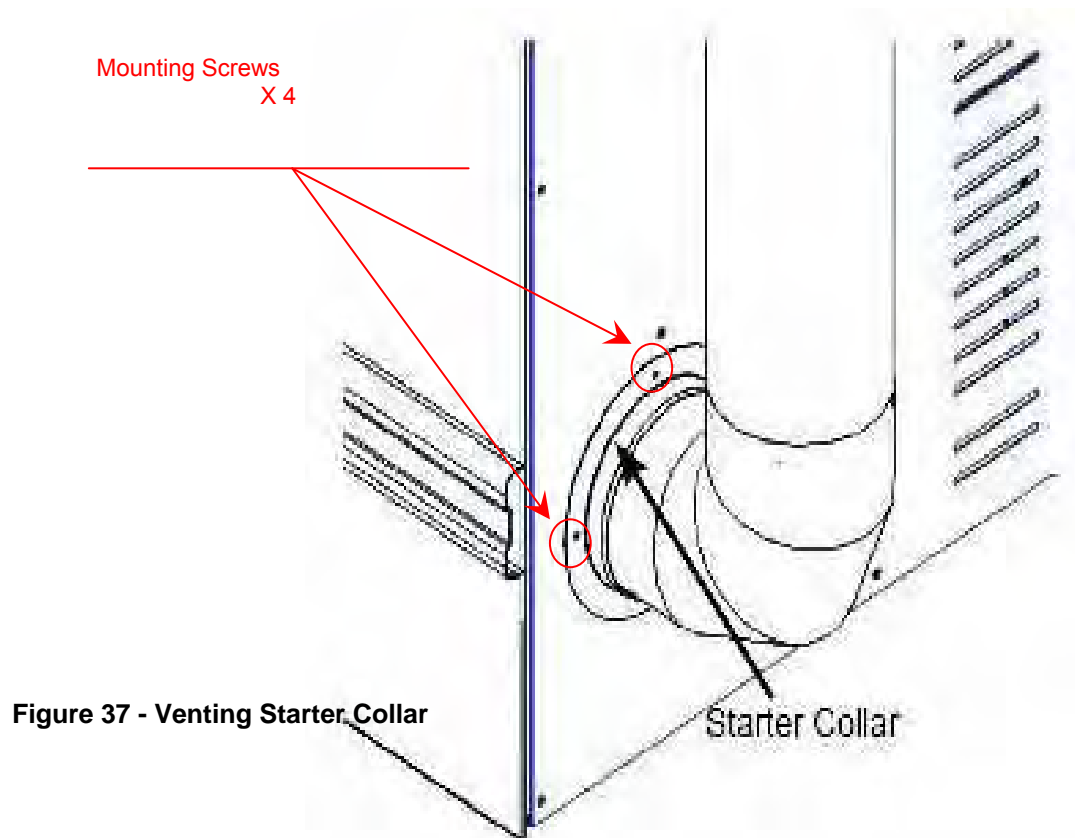


Figure 37 - Venting Starter Collar

4. The outer pipe sections should not have a visible gap. See **Figure 38 - Venting - No Visible Gaps**.

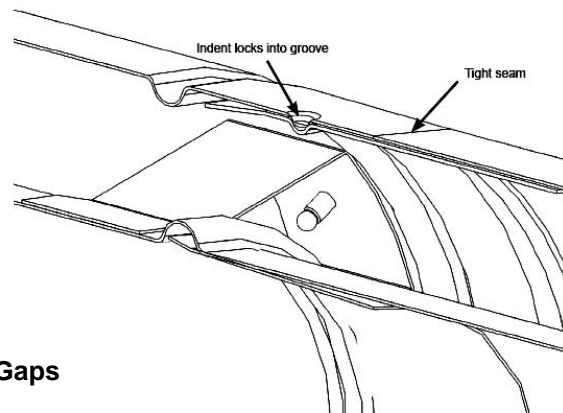


Figure 38 - Venting - No Visible Gaps

5. Drop a plumb bob to the center of the Elbow connected to the Room Heater flue outlet and mark center point on the ceiling. Cut your hole in the ceiling 4" larger than the pipe diameter. Install the flat firestop support (see Figure below) and continue to step 6.

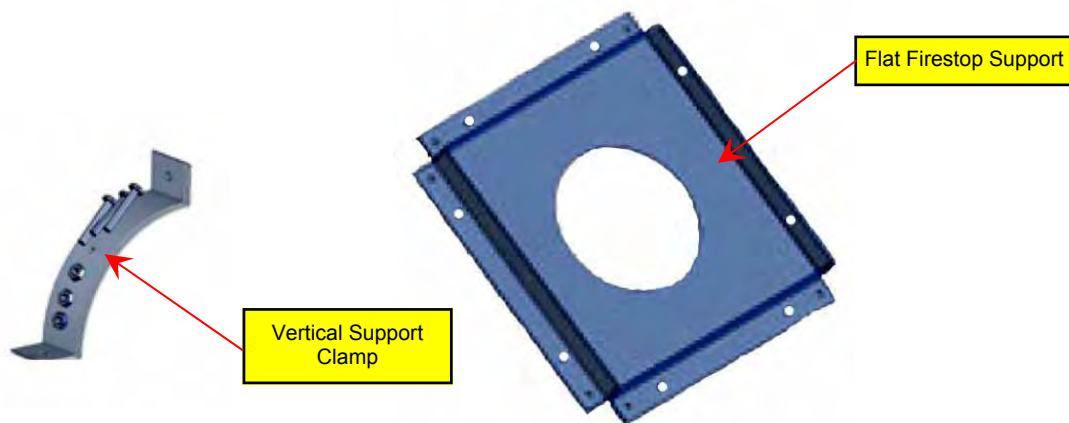


Figure 39 - Venting Flat Fire Stop & Vertical Support Clamp

6. Connect the vertical pipe to the elbow attached to the Room Heater: Attach each section of pipe by pushing male and female ends of pipe together until pipe is in locked position.

7. Install Wall Straps every four (4) feet in both vertical and horizontal vent runs (required).

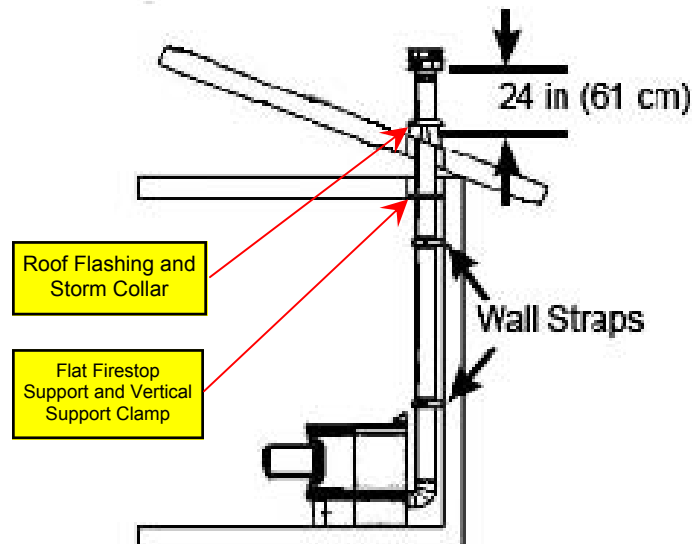


Figure 40 - Venting Vertical Run Supports

8. When the pipe passes through the Firestop/Support at ceiling, attach the vertical pipe support (see Figure above) around pipe and let it rest on the topside of the Firestop / Support. If desired, a Decorative Collar can be installed over the Firestop/Support for a finished look.
9. After lining up for hole in roof, use same method as above and cut either a oval or square hole in the roof. Always cut the hole at least 4 in. (10cm) larger than the diameter of the pipe. Install the upper edge and sides of Flashing under the roofing materials and nail to the roof along the upper edge. Do not nail the lower edge. The Vent Cap must extend a minimum of 36 in. (91cm) above the roof. Also, the Vent Cap must be 24 in. (64cm) higher than the highest part of the roof or structure that is within 10 ft. (3m) of the chimney measured horizontally. See **Figure 40 - Venting Vertical Run Supports**.

10. Seal all nail heads with high-temperature waterproof sealant. To finish, apply high-temperature waterproof sealant where the Storm Collar will meet the vent and Roof Flashing; slide Storm Collar down until it sets on the Roof Flashing, tighten the bolt on the Storm Collar, put the Vent Cap on and push to lock.
See **Figure 41 - Venting Termination Cap**

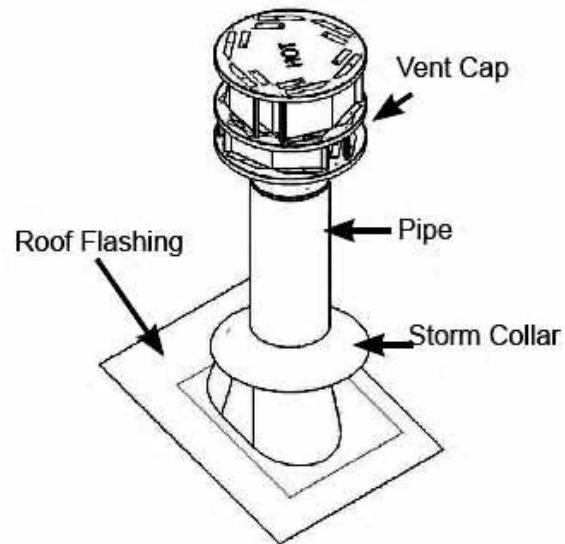
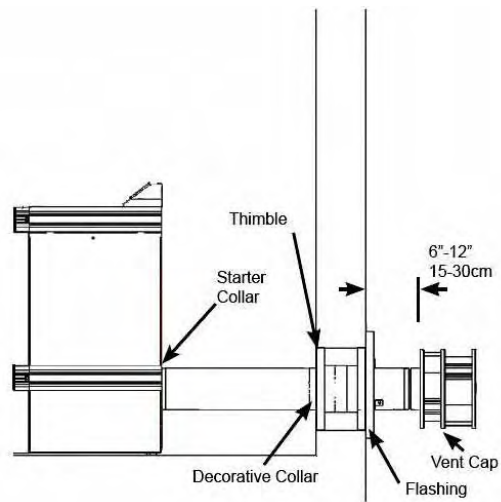


Figure 41 - Venting Termination Cap

Horizontal Through-The-Wall-Installation

The flue exit is on back of the Room Heater, and if a horizontal through-the wall installation is desired:

Figure 42 - Horizontal Install

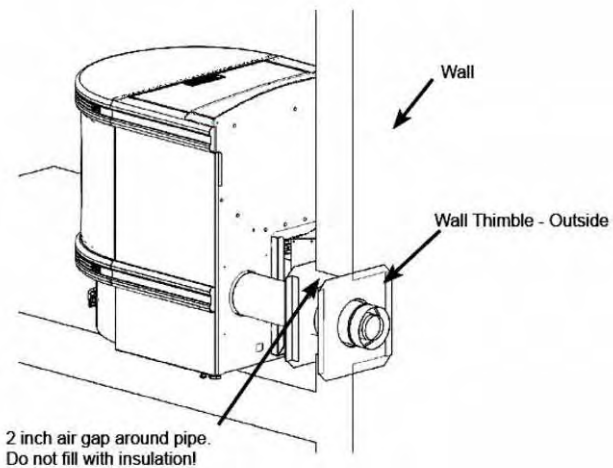


1. Place the Room Heater according to installation instructions. See **Figure 26 - Clearances for the MaxFire** or **Figure 27 - Clearances for the UBB**

Vent Locations:

2. Locate vent termination per the NFPA rules. See **Figure 28 - Venting Locations**.
3. Cut and frame a 10 in. X 10 in. (25cm x 25cm) square opening in the wall (the hole in the wall board may need to be larger). See Figure 31 (page 39). The telescoping Wall Thimble is to be installed in the interior and exterior portion of the wall. (Wall Thimble adjusts from 4 ¼ in. to 7 in. (11cm to 18cm) to accommodate most wall thicknesses). See **Figure 43 - Wall Thimble**.
 - The Wall Thimble flanges are to be attached to the supports with four screws, one in each corner. Use of 1/2 inch or longer screws are recommended.
 - The Wall Thimble may be covered on the inside by the Decorative Collar. It is important to slide the collar on before adding additional venting.

Figure 43 - Wall Thimble



4. Attach the outside vent flashing to the exterior wall with four screws. Seal the outside section of the Horizontal Flashing and Wall Thimble to the exterior wall with non-hardening sealant. Top tab is to be placed under wall siding.
5. Connect the Starter Collar to back of Room Heater and attach sufficient pipe to the Room Heater to extend 4 in. - 8 in. (10-20cm) beyond the Flashing. See **Figure 42 - Horizontal Install**.
6. Anchor the pipe to the Horizontal Flashing with the three brackets using the self tapping sheet metal screws shipped with the flashing. The back/base of the cap is to extend 6 - 12 inches (15-30 cm) from the flashing.

See **Figure 44 - Horizontal Wall Flashing**.

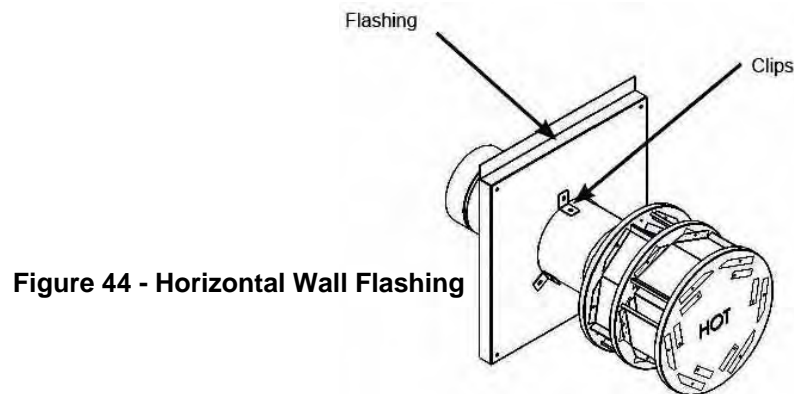


Figure 44 - Horizontal Wall Flashing

7. Attach the Vent Cap, note orientation of embossment, to the extended pipe. Use high temperature (500 F/260 C) silicone sealant between all pipe joints. See **Figure 35 - Venting Silicone Sealant**.

NOTE: Some amount of soot and discoloration may occur on the outside of the house.

NOTE: If ice forms on the Vent Cap in cold weather, run the Room Heater on high for a couple of hours to clear.

Cathedral Ceiling Installation

1. Mark a line on the side of the Cathedral Ceiling Support Box to correspond to the line of the roof pitch. Allow for the Support Box to protrude below the finished ceiling a minimum of 2 in (5 cm). See **Figure 45 - Support Box**.

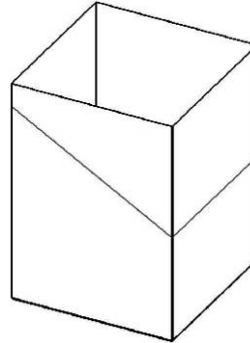


Figure 45 - Support Box

2. Position the appliance at its proper location on the floor. Pay close attention to the installation instructions as to distances from combustibles, etc. The appliance must also be positioned so the Support Box will not interfere with roof rafters or other structural framing.
3. Run a plumb line from the center of the flue exit on the Room Heater to the ceiling. Mark the point on the ceiling where the plumb line intersects. This represents the center of the support box. Drill a small hole through the ceiling at this point, so it can be located from the top of the roof.
4. From the roof, locate and mark the outline of the Support Box.
5. Remove shingles or other roof covering as necessary to cut the rectangular hole for the Support Box. Cut the a hole 1/8 in (3 mm) larger than the dimensions of the Support Box. The rectangular hole should be centered on the small hole which you drilled through the ceiling to mark the location. Again, insure that you are not cutting through rafters or framing members.
6. Run the Support Box through the roof, and place it so that the bottom of the Support Box protrudes at least 2 in (5 cm) below the finished ceiling. Align the Support Box vertically and horizontally with a level. Temporarily tack the Support Box in place through the inside walls and into the roof sheathing. See **Figure 46 - Support Box Side View**.

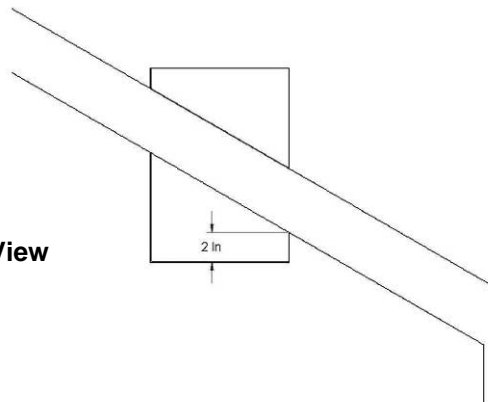


Figure 46 - Support Box Side View

7. Using tin snips, cut the Support Box from the top corners down to the roof line and fold the resulting flap over the roof sheathing. Before nailing it to the roof, run a bead of non-hardening sealant around the outside top edges of the Support Box so as to make a seal between the box and the roof. Clean out any combustible material or debris from inside the Support Box. See Figure below.

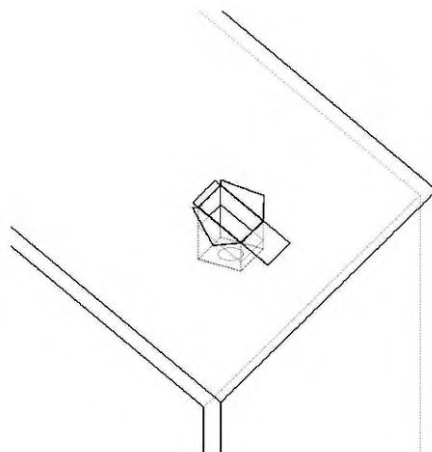


Figure 47 - Support Box Cuts

8. Place the Vertical Support Clamp (around the top of the hole in the bottom of the Support Box. See Figure below.

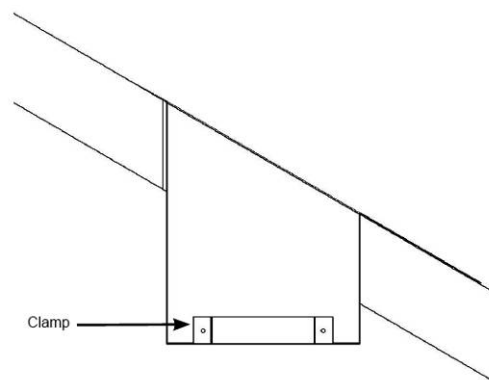


Figure 48 - Vertical Support Clamp

9. Connect the necessary amount of pipe sections to reach the Room Heater at a point where the Vent Cap will extend a minimum of 36 in (91 cm) above the roof. Also, the cap must be 24 in (61 cm) higher than the highest part of the roof or structure that is within 10 ft (3 m) of the chimney, measured horizontally. . See Figure below

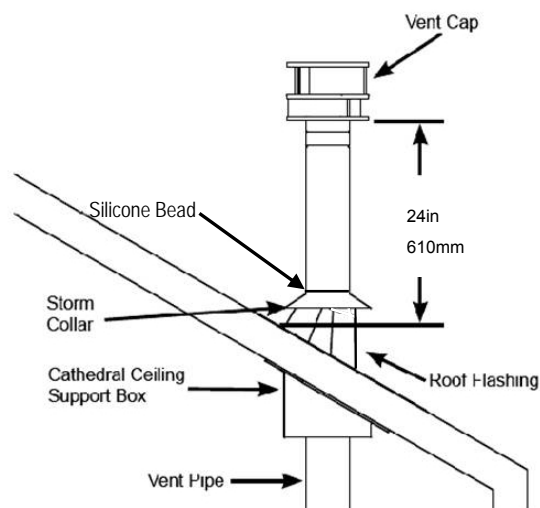


Figure 49 - Vent Cap Placement

10. Run the assembled pieces of vent pipe down through the Clamp of the Support Box and connect to the appliance with an Elbow and Starter Collar. See General Vent Installation Instructions for details on connecting the pipe together.
11. Using a level, make slight adjustments in the position of the appliance until the pipe is truly plumb (vertical). Tighten the bolts in the Clamp.
12. Slip the Flashing over the pipe section(s) protruding through the roof. Secure the base to the roof with roofing nails. Insure that the roofing material overlaps the top edge of the Flashing. See Figure 41.
13. Seal all nail heads with high-temperature waterproof sealant. To finish, apply high-temperature waterproof sealant where the Storm Collar will meet the Vent and Flashing; slide Storm Collar down until it sets on the Flashing, put the Vent Cap on and push to lock. See Figure 33 (page 40).

Connecting To Existing Class A Chimney Either 6" Or 8"

Due to cleaning, inspection and condensation issues, Bixby no longer recommends connecting the Room Heater to an existing Class A chimney.

Installation Through The Side Of A Masonry Chimney

Due to cleaning, inspection and condensation issues, Bixby no longer recommends connecting the Room Heater to an existing masonry chimney. The venting may pass through the chimney to the outside.

See previous pages for horizontal venting information.

Some of the tools needed for the installation are, but not limited to:

- Level (a six inch level is recommended)
- Hammer
- Screwdriver
- Tape measure
- High temperature waterproof sealant (min 500F)
- Saber or keyhole saw
- Stud finder
- Adjustable wrench

Remember to use PPE (Personal Protection Equipment)

- Eye protection
- Gloves

Vent Maintenance

- **It is essential to have the venting and vent cap cleaned every year (Each Spring) to remove soot build up.**
- Use a plastic, wood, or flexible nylon brush. Do not use a stiff brush that will scratch the stainless steel liner of your system.
- Bixby Direct Vent systems must be installed so that access is provided for inspection and cleaning.
- The vent system should be inspected at least once every month during the heating season.
- Chemical cleaners must be used with great caution. Use only those which are absolutely guaranteed not to corrode or have any other harmful effects.
- Due to the nature of solid fuels and their production of ash, Bixby Energy Systems is not responsible for flue by-products that might discolor roofs or walls.

Note:

There are manufacturers that make pellet brushes that have a small ball on the tip of the brush. They also make flexible interconnecting fiberglass rods which when used with the brush allow the brush to be inserted through several 90° elbows. This combination will allow cleaning of the venting pipe without having to disassemble the pipe.

Operating Instructions

Fuel

It is strongly recommended that only Dry Shelled Corn (whole kernels), Wood Pellets (recommended maximum size approximately 1/4 in (6mm) diameter x 1 1/4 in (32mm) long), Bixby Certified Corn or approved pelletized biomass fuel be used in this Room Heater (Up to 8,700 BTU's per pound). When using Dry Shelled Corn, clean corn (free of foreign material like cobs, twigs, stones, etc.) with moisture level around 14% or less is recommended. The use of "cracked corn" or seed corn is not recommended due to combustion and feed issues. Use Premium Wood Pellets made for use in Pellet Room Heaters. High-grade wood pellets may be used, but cleaning of Bixby Room Heater and venting components may be required more frequently due to excess ash resulting from fuel contamination from pitch and other impurities in the wood.

Caution should be used in burning unclean or high moisture corn. Corn that is unclean can produce undesirable deposits and excessive ash in your Room Heater and heating efficiency can be dramatically affected. Corn of more than 14% could generate mold in the hopper plus increase issues of condensation in the vent system. Use of unsuitable fuel may harm the Bixby Room Heater and could void its warranty. High performance equipment, like your Room Heater, performs better when given the best fuel.

The Room Heater is setup to burn corn from the factory. To burn wood pellets, simply open the left side panel and locate the fuel switch. Toggle the switch from "CORN" to "WOOD". See Figure 42.

CAUTION: DO NOT BURN GARBAGE, OR FLAMMABLE FLUIDS SUCH AS GASOLINE, NAPHTHA OR ENGINE OIL IN YOUR BIXBY ROOM HEATER. Store any fuel away from your heater.

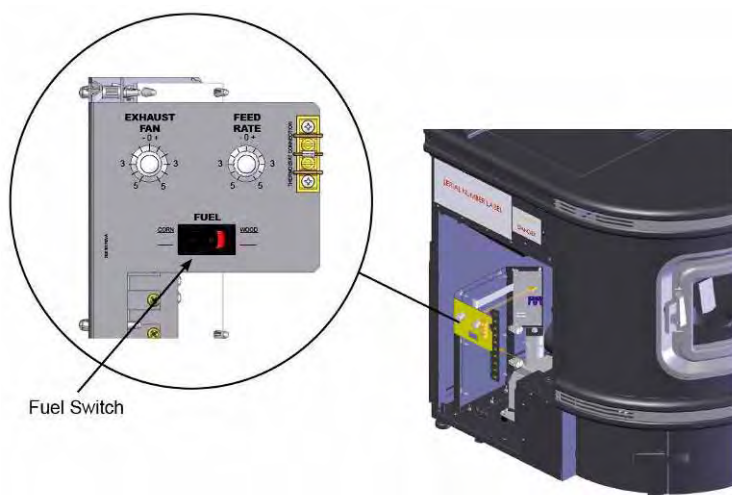


Figure 50 - Fuel Switch - MaxFire

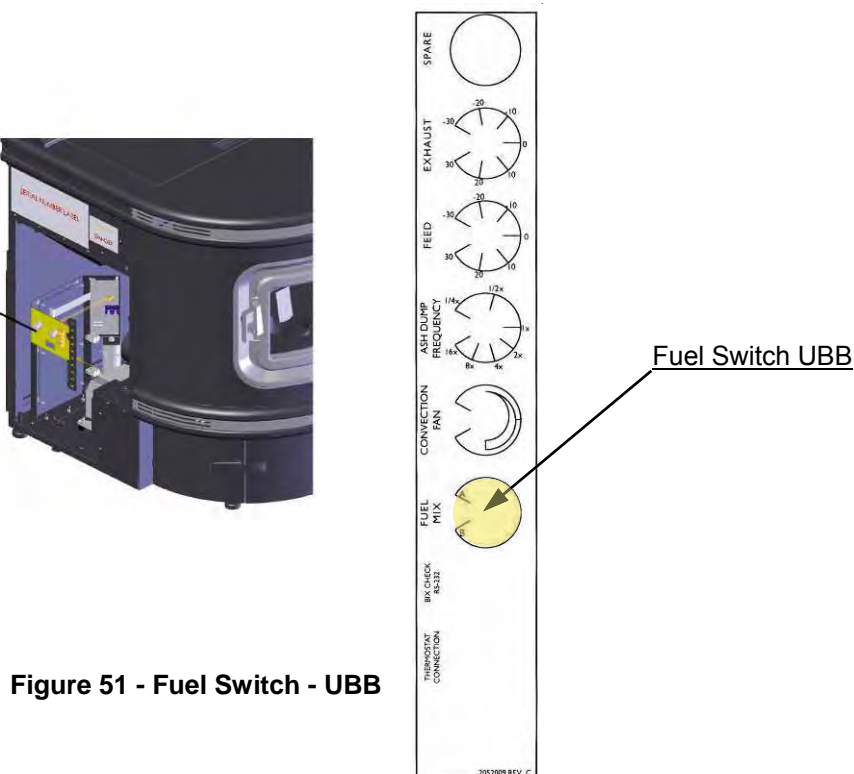


Figure 51 - Fuel Switch - UBB

Start Up

NOTE: *It is recommended that all gold or silver plated surfaces of the Bixby Room Heater be cleaned with a mild glass cleaner before initial startup.*

NOTE: Use of a surge protector is recommended but not required for heater operation.

CAUTION: Operate the Bixby Room Heater only with the Fuel Hopper Door closed. Failure to do so may result in emission of products of combustion from the Fuel Hopper under certain conditions. Do not overfill or extend this hopper.

1. Open the Fuel Hopper Door on the top of the Bixby Room Heater and fill the hopper with Corn or a Biomass Pellet Fuel, or an approved alternative. The capacity of the fuel hopper is approximately 106 lbs (48 kg).
2. Verify that the fuel deflector is in place.
3. Plug in the Bixby Room Heater's grounded 3-prong power cord. A grounded 120 volt, 60Hz, 15 amp power supply is required, supplying a minimum of 112 volts during startup. Startup problems may occur when the supply voltage is lower than 112 volts. Also it is suggested that a dedicated circuit is supplied to the Bixby Room Heater. The Bixby Room Heater draws approx. 10 amps during the startup period and approx. 2 amps during the run period. If other appliances or devices are connected to the same circuit as the heater is on, the circuit may trip during startup.

Do not use extension cords.

The furnished power cord must be plugged directly into a suitable outlet. Route the power cord away from the Bixby Room Heater. The exhaust fan will operate for approximately 30 minutes when the heater is plugged in. This is normal and is to ensure that any remaining combustion gases are removed in the event of a power outage.

4. Manual Operation: Press the "On" button on the Control Panel. Then press the up/down arrows to bring heat output to the desired level (the "Up" arrow increases the heat output, the "Down" arrow decreases it). The first time the Bixby Room heater is used, or in cases when fuel in the hopper has been completely expended, sufficient fuel may not have been supplied to allow the unit to start properly. If this happens, press the "Off" button, and then the "On" button to restart the unit after fuel begins feeding into pot.
- 4a. Optional Thermostat Operation: The thermostat will not start the Room Heater. When the thermostat is calling for heat, the Room Heater will operate at the selected level. When the thermostat is not calling for heat, the Room Heater will drop to level 1 to maintain the burn. The lights will blink when the thermostat is not calling for heat.
- 4b. **Manual Igniting Information:** To manually ignite the Room Heater, press the "ON" button on the control panel. After the fuel has started to be delivered to the burn pot, remove the ash drawer to access the bottom of the pot. Ignite the fuel by heating the bottom of the burn pot with a MAP torch and maintain a flame. Once the fuel has ignited, replace and close the ash drawer and verify the flame is stable. Wood pellets and starter gel may be used to assist the lighting. See below for cautions.

5. Normally, the fuel will ignite within three to seven minutes, and full flame stability will be achieved within twenty minutes. Heat production will then begin to reach the desired comfort level. If stable ignition does not take place within this time and there is fuel building up in the burning area, press the "Off" button and then the "On" button to restart the unit.

6. To shut down the Bixby Room Heater, press the "Off" button on the control panel, allow three to ten minutes for flame-out to occur.

NOTE: The convection blower and the exhaust fan will continue to run for 30 minutes as the Room Heater cools.

7. **Power Outages:** If there is a momentary (less than 10 second) loss of power, your heater will return to the set heating level. If the power is interrupted for longer than 10 seconds, you will have to restart the Heater by pressing the "ON" button after the power is restored. The #1 light will be blinking, indicating a power failure.

NOTE: Ash Drawer: Opening the ash drawer during heater operation will disable the dump process. Be sure to replace and latch the ash drawer once emptied. If the ash drawer is open for more than 20 minutes, the unit will go directly into shut-down mode.

NOTE: Front Door: The door must be closed and latched while the Room Heater is running. Always allow the Room Heater to cool before opening for cleaning. If the door is open for more than one (1) minute, the unit will go directly into shut-down mode.

CAUTION: Never use highly-volatile fuels such as gasoline, gasoline-type lantern fuel, kerosene, charcoal lighter fluid, or similar substances in the Bixby Room Heater. Keep all such liquids well away from the Bixby Room Heater when it is in use. Use of such fuels could cause over-firing and will void the unit's warranty.



Wood pellets and starter gel may help if there is difficulty in manual starting, but do not use starter gel after startup.

Specifications:

See the Operating and Maintenance Manual that comes with the heater.

Approximate Hours/Full Load/Per Setting *

Level	Aprox. Feed Rate lbs/hr (kg/hr)	Time Between Ash Dumps	Aprox. Hours/ Full Load
1	1.8 (0.8)	21 Hours	57
2	2.1 (1.0)	17 1/2 Hours	48
3	2.3 (1.1)	16 Hours	43
4	2.6 (1.2)	14 Hours	38
5	3.0 (1.4)	12 1/2 Hours	34
6	3.5 (1.6)	10 1/2 Hours	29
7	3.9 (1.8)	9 1/2 Hours	26
8	4.6 (2.1)	8 Hours	22

*Assumes running at a single level, actual time will vary as the burn level changes, starting and shutting down, and trim knob adjustments.

Figure 52 - Approximate Burn Times & Fuel Consumption

Based on the stove running on highest setting – Level 8,
the stove has the following (approximate F°) hot areas:

Top of stove:	140 degrees
Exhaust side of the wrap:	160 degrees
Above the door:	320 degrees
Inside the Hopper:	120 degrees
Glass Door:	620 degrees

Figure 53 - Stove Hot Spots

Troubleshooting Procedures

When experiencing a malfunction, please read through the following list of possible problems to determine which of them most closely approximates the trouble you are encountering. This will reduce troubleshooting time and effort.

CAUTION: *Always be sure to unplug electrical connection to Bixby Room Heater before any service procedures are performed.*

NOTE: If you need to call the service department, verify the serial number (located on the left side of the hopper) and have this with you.

NOTE: Many performance issues can be solved through the use of the trim pot knobs located near the control board behind the right side panel. Manual adjustment of either the fuel feed rate or the exhaust fan speed may be necessary with different fuels (change in moisture for example), different seasons (change in outside air temperature) or other changes in the operating conditions. Read through the troubleshooting chart below to determine which knob to adjust and in which direction.

<u>PROBLEM</u>	<u>POSSIBLE CAUSE/REMEDY</u>
No response when Room Heater is plugged in.	Check the 120 volt power supply circuit for adequate voltage. Check fuse on circuit board and replace if necessary.
No fire or fuel in burn pot.	Check to assure that there is fuel in the hopper. Verify feeder wheel is turning. (See error codes) Check to assure that the fuel feeder tube is not blocked by fines or “bridging” of fuel pellets or kernels. Push the “Off” button and then the “On” button to attempt a new startup. Door or ash drawer is ajar (See error codes).
Flame goes from high to low to high	Feed rate is low, turn the feed rate up 1 notch using the Fuel trim pot knob and observe. Repeat if necessary.
Smoke from convection air outlet (louvers) or hopper.	Some wisps of smoke may occur during startup. This is normal. Check for debris under the feeder wheel. If the smoke doesn’t clear within 15 minutes or if excessive immediately shut down unit, ventilate the area and contact your dealer.
Unburnt fuel in ash drawer	A small amount is normal. During start up, the burner pot is emptied and as a result, unburnt fuel left in the pot will be dumped. Excessive ammounts is likely due to fire going out due to either too much fuel (smothering the fire) or too much air (burning too fast). Observe Room Heater, if pot begins to fill with fuel, turn fuel down. If fuel is burning too fast, turn air down. Hopper may have run out of fuel causing the fire to go out.
Ash dump jamming on clinker	Burn may be too hot. Feed rate / fan speed may need adjustment - turn fan speed down or feed rate up 1 notch and observe. Repeat if necessary.

<u>PROBLEM</u>	<u>POSSIBLE CAUSE/REMEDY</u>
Fire fails to start	<p>Be sure enough fuel is in the burn pot. Fuel should cover the bottom to a level of approximately 1/2".</p> <p>Check bottom of burn pot for built-up ash or deposits and remove.</p> <p>Check for flashing light #6, exhaust fan failure (contact your dealer).</p> <p>Push the "Off" button on the control panel. Wait three minutes and push the "On" button to attempt a new startup.</p> <p>NOTE: When the Room Heater is cold (below normal room temperature), a "second start" may be required. This is normal and a result of needing to pre-heat the burn pot.</p> <p>Check the igniter fuses located on the control board. (See error codes).</p> <p>Verify air pump is working during start up (feel pump for vibration).</p> <p>Inspect Room Heater and venting to see if cleaning is needed.</p>
Fire starts but shuts down after approximately 12 minutes. (#2 indicator light)	<p>Check feeder chute to be sure fuel is feeding.</p> <p>Check to make sure exhaust thermocouple wire has not been disconnected from the control board. (Two wire connection, upper right hand side).</p> <p>If feeder stops after 12 minutes, electronics may be faulty; contact your dealer for service.</p>
Dark yellow and or lazy flame, slow start-up or excessive smoke present.	<p>Check for spent fuel or too much fuel clogging bottom of burn pot.</p> <p>Burn pot, lower paddle holes may require cleaning.</p> <p>Heat exchanger tubes may require cleaning.</p> <p>Check vent pipe for blockage of exhaust gasses and incoming combustion air.</p> <p>Feed rate / fan speed may need adjustment - turn fan speed up or feed rate down 1 notch and observe. Repeat if necessary.</p>
Excessive volume of fire, build-up of ash and dirty glass	<p>Burn pot may require cleaning</p> <p>The venting system or heat exchanger may need to be cleaned.</p> <p>If the glass needs to be cleaned more than every 4 to 5 bags of fuel (two full hoppers), contact your dealer to verify Room Heater operation.</p>
Burn pot filling with fuel	<p>Room Heater may not be level</p> <p>Feed rate / fan speed may need adjustment - turn fan speed up or feed rate down 1 notch and observe. Repeat if necessary.</p> <p>Verify that the exhaust is not obstructed. See Maintenance and Cleaning instructions - Cleaning Heat Exchanger Tubes. In addition, the vent pipe may need to be cleaned.</p> <p>Holes in burn pot may need to be cleaned</p> <p>Check the alignment of the burn pot components</p> <p>Check the installation of the plates covering the heat exchanger tubes.</p>

Figure 45a - Troubleshooting

Notes:

Normal Operation Sequence

10 - Plug the Stove In

- 11 LED's indicate P.O.S.T.
- 12 Burn Drive cycles three (3) times
- 13 Exhaust Fan Runs for 30 min then OFF

20 - Startup Mode

- 21 Push ON Button & set Heat Level
- 22 #1 LED on
- 23 Number of LED's show Set Heat Level
- 24 Burn Drive cycles three (3) times
- 25 Feed Wheel Begins Feeding Fuel
- 26 After 1½ minutes, Air pump comes ON
- 27 After 15 seconds, the Igniters turn ON
- 28 Within 5 minutes, Smoke and then Flame
- 29 Igniters turn OFF after Flame is established
- 30 After 15 seconds the Air Pump goes OFF
- 31 Stove Ramps to Heat Level 4
- 32 After 20 minute Startup Period, stove ramps up or down to User Set Heat Level

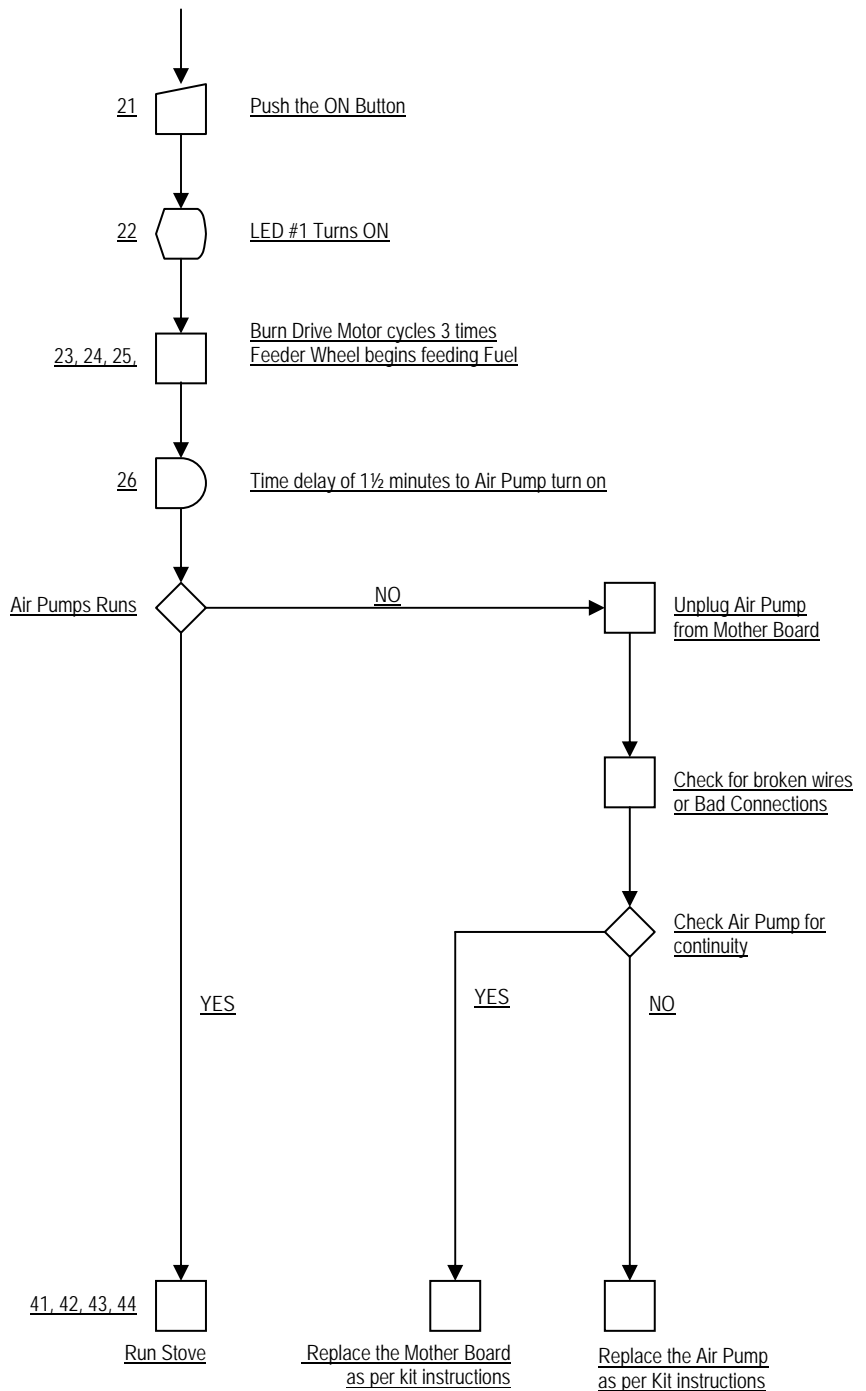
40 - Normal Run mode

- 41 Stove runs at User SET HEAT Level
- 42 Ash Dump per Heat Level
- 43 Stove ramps to Heat Level 4 during the Ash Dump process
- 44 Stove runs until User turns the Stove OFF

50 - Normal Shut Down Mode

- 51 Push the OFF Button
- 52 Feeder Wheel Stops feeding Fuel
- 53 1st 10 minutes Exhaust Fan Increases speed
- 54 Next 20 minutes Exh. Fan runs at 50% speed
- 55 After 30 min. total, Ash Dump, Stove is OFF

Air Pump Does Not Operate



Normal Operation Sequence

10 - Plug the Stove In

- 11 LED's indicate P.O.S.T.
- 12 Burn Drive cycles three (3) times
- 13 Exhaust Fan Runs for 30 min then OFF

20 - Startup Mode

- 21 Push ON Button & set Heat Level
- 22 #1 LED on
- 23 Number of LED's show Set Heat Level
- 24 Burn Drive cycles three (3) times
- 25 Feed Wheel Begins Feeding Fuel
- 26 After 1½ minutes, Air pump comes ON
- 27 After 15 seconds, the Igniters turn ON
- 28 Within 5 minutes, Smoke and then Flame
- 29 Igniters turn OFF after Flame is established
- 30 After 15 seconds the Air Pump goes OFF
- 31 Stove Ramps to Heat Level 4
- 32 After 20 minute Startup Period, stove ramps up or down to User Set Heat Level

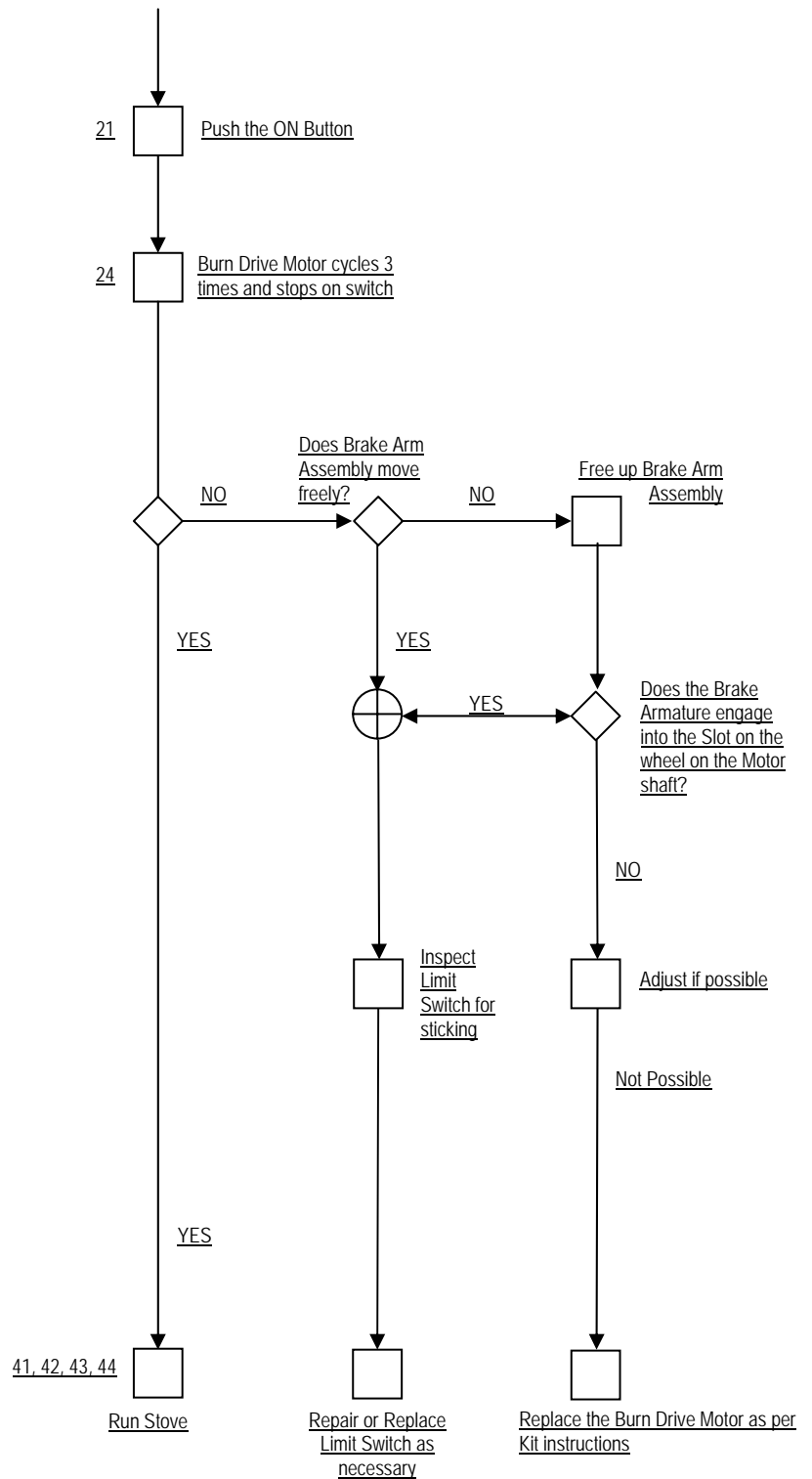
40 - Normal Run mode

- 41 Stove runs at User SET HEAT Level
- 42 Ash Dump per Heat Level
- 43 Stove ramps to Heat Level 4 during the Ash Dump process
- 44 Stove runs until User turns the Stove OFF

50 - Normal Shut Down Mode

- 51 Push the OFF Button
- 52 Feeder Wheel Stops feeding Fuel
- 53 1st 10 minutes Exhaust Fan Increases speed
- 54 Next 20 minutes Exh. Fan runs at 50% speed
- 55 After 30 min. total, Ash Dump, Stove is OFF

Burn Drive Motor Does Not Park



Normal Operation Sequence

10 - Plug the Stove In

- 11 LED's indicate P.O.S.T.
- 12 Burn Drive cycles three (3) times
- 13 Exhaust Fan Runs for 30 min then OFF

20 - Startup Mode

- 21 Push ON Button & set Heat Level
- 22 #1 LED on
- 23 Number of LED's show Set Heat Level
- 24 Burn Drive cycles three (3) times
- 25 Feed Wheel Begins Feeding Fuel
- 26 After 1½ minutes, Air pump comes ON
- 27 After 15 seconds, the Igniters turn ON
- 28 Within 5 minutes, Smoke and than Flame
- 29 Igniters turn OFF after Flame is established
- 30 After 15 seconds the Air Pump goes OFF
- 31 Stove Ramps to Heat Level 4
- 32 After 20 minute Startup Period, stove ramps up or down to User Set Heat Level

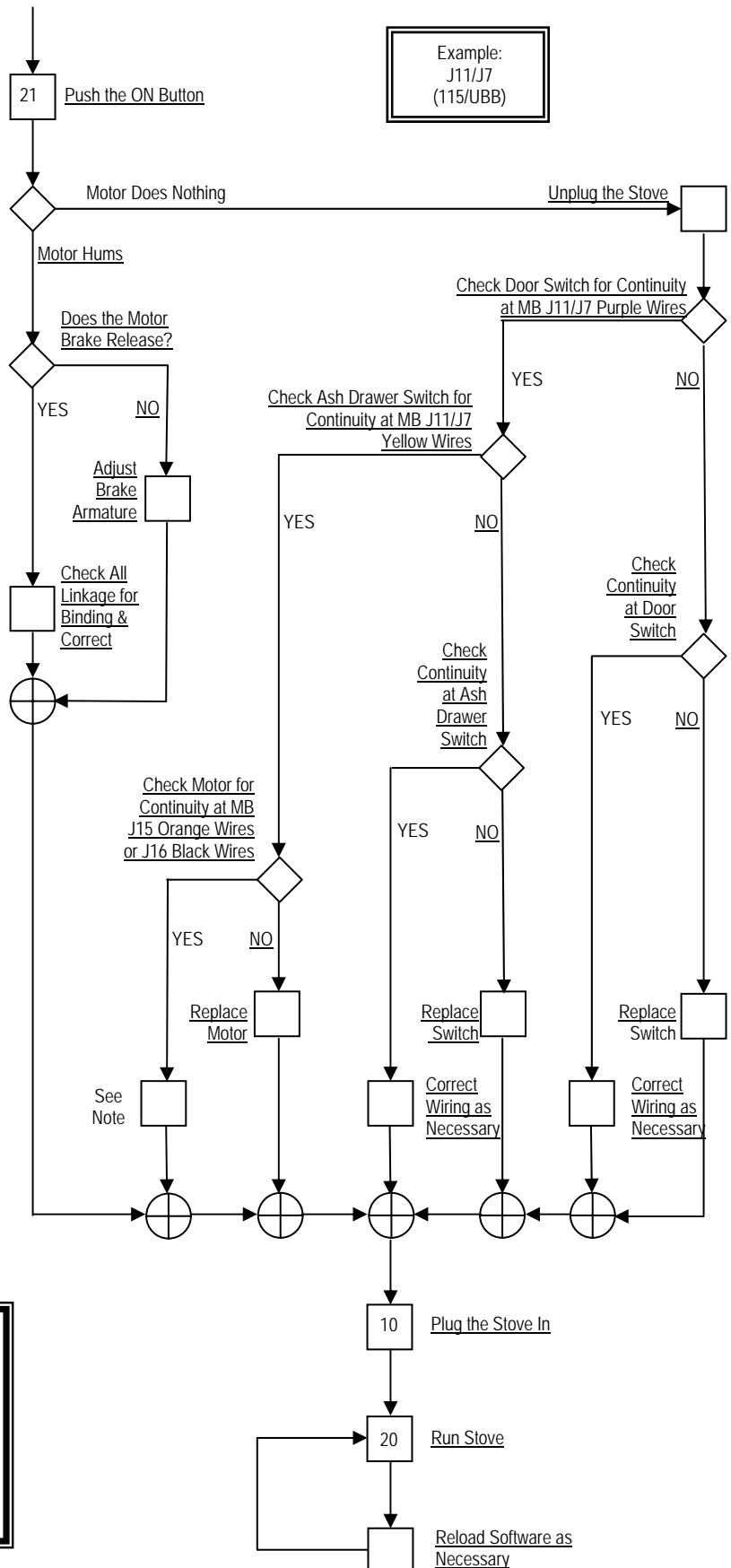
40 - Normal Run mode

- 41 Stove runs at User SET HEAT Level
- 42 Ash Dump per Heat Level
- 43 Stove ramps to Heat Level 4 during the Ash Dump process
- 44 Stove runs until User turns the Stove OFF

50 - Normal Shut Down Mode

- 51 Push the OFF Button
- 52 Feeder Wheel Stops feeding Fuel
- 53 1st 10 minutes Exhaust Fan Increases speed
- 54 Next 20 minutes Exh. Fan runs at 50% speed
- 55 After 30 min. total, Ash Dump, Stove is OFF

Burn Drive Motor Does Not Operate



Note:

Inspect all connections including any board to board connections for loose, broken or improperly connected connections

Normal Operation Sequence

10 - Plug the Stove In

- 11 LED's indicate P.O.S.T.
- 12 Burn Drive cycles three (3) times
- 13 Exhaust Fan Runs for 30 min then OFF

20 - Startup Mode

- 21 Push ON Button & set Heat Level
- 22 #1 LED on
- 23 Number of LED's show Set Heat Level
- 24 Burn Drive cycles three (3) times
- 25 Feed Wheel Begins Feeding Fuel
- 26 After 1½ minutes, Air pump comes ON
- 27 After 15 seconds, the Igniters turn ON
- 28 Within 5 minutes, Smoke and then Flame is established
- 29 Igniters turn OFF after Flame is established
- 30 After 15 seconds the Air Pump goes OFF
- 31 Stove Ramps to Heat Level 4
- 32 After 20 minute Startup Period, stove ramps up or down to User Set Heat Level

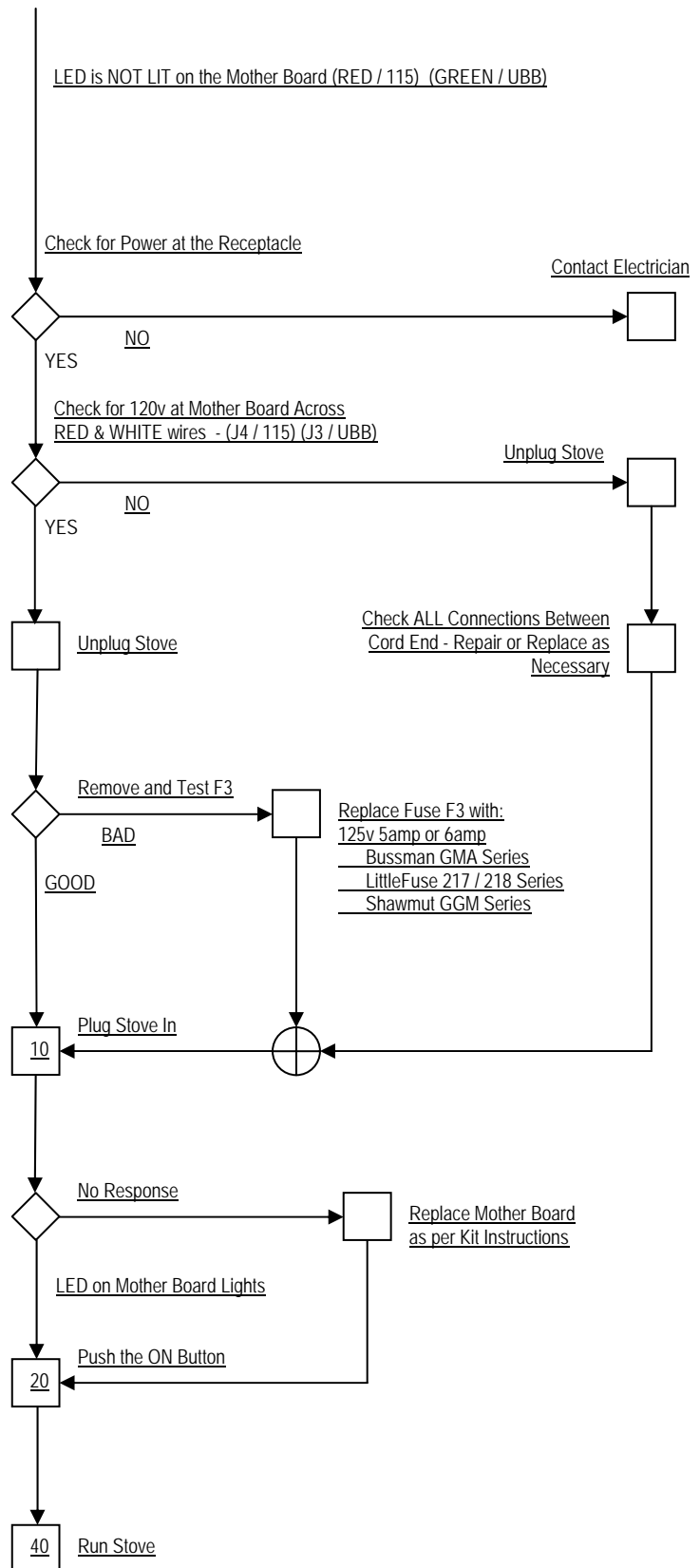
40 - Normal Run mode

- 41 Stove runs at User SET HEAT Level
- 42 Ash Dump per Heat Level
- 43 Stove ramps to Heat Level 4 during the Ash Dump process
- 44 Stove runs until User turns the Stove OFF

50 - Normal Shut Down Mode

- 51 Push the OFF Button
- 52 Feeder Wheel Stops feeding Fuel
- 53 1st 10 minutes Exhaust Fan Increases speed
- 54 Next 20 minutes Exh. Fan runs at 50% speed
- 55 After 30 min. total, Ash Dump, Stove is OFF

Stove Does Not Respond



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Glossary of Terms

Touch Pad:	Bixby operator control panel.
Feeder Wheel:	A solid round wheel with slots to feed a pre-measured amount of fuel to the Burn Pot.
Feed Tube:	A tube to deliver fuel from the Feeder Wheel to the Burn Pot.
Hopper:	A holding bin for the fuel.
Burn Pot:	The Stainless Steel cylinder in which combustion occurs.
Gear-motor:	A self contained motor connected to a series of gears designed to increase torque at the output shaft.
Program:	A set of written instructions imbedded within the stoves' computer chip telling the stove how to react to various inputs.
Flash point:	A scientific attribute, the temperature at which a liquid or solid can ignite.
Igniter:	An electronic device used to heat the air to 1400* during ignition.
Air Pump:	A pump which delivers air to the igniters.
Artificial Intelligence:	Able to apply reasoning capabilities to reach a conclusion.
Thermocouple:	A thermocouple is a sensor that is used to measure (sense) temperature.
Vortex:	A vortex is a spinning, often turbulent, flow.
Clinker:	The incombustible residue, fused into an irregular lump that remains after combustion.
Trim Pot:	Usage of the term potentiometer (or 'pot' for short) describes an electronic component which has a user-adjustable resistance.
Firebox:	The area where fuel is burned.
Convection:	The transfer of heat caused by molecular motion.
Mother board:	The main circuit board that controls most of the stove's functions.
Daughterboard:	The small circuit board that controls the igniters in the MaxFire..
Diagnostic Test:	A self test of the computers internal program and all sensors connected to the motherboard.
Ash Dump:	The process of removing the clinker from the Burn Pot.
Tachometer:	A device that indicates the speed of the exhaust fan, converted to RPM.

Glossary of Terms (cont)

Snap Disc:	A thermally actuated switch which changes state at preset temperatures with a set temperature differential between the high temperature and the low temperature.
Heat Exchanger:	A device built for efficient heat transfer from the exhaust gas to the convection air, and is separated by a solid wall so that they never mix.
Surge Protector:	An electrical device designed to protect electrical devices from power surges and voltage spikes.
Joule:	Measure of electrical energy, also refers to a surge suppressor's ability to absorb energy.
Calcium silicate:	A white free-flowing powder derived from limestone and diatomaceous earth. Calcium silicate has no known adverse effects to health. It is used in roads, insulation and roof tiles.
